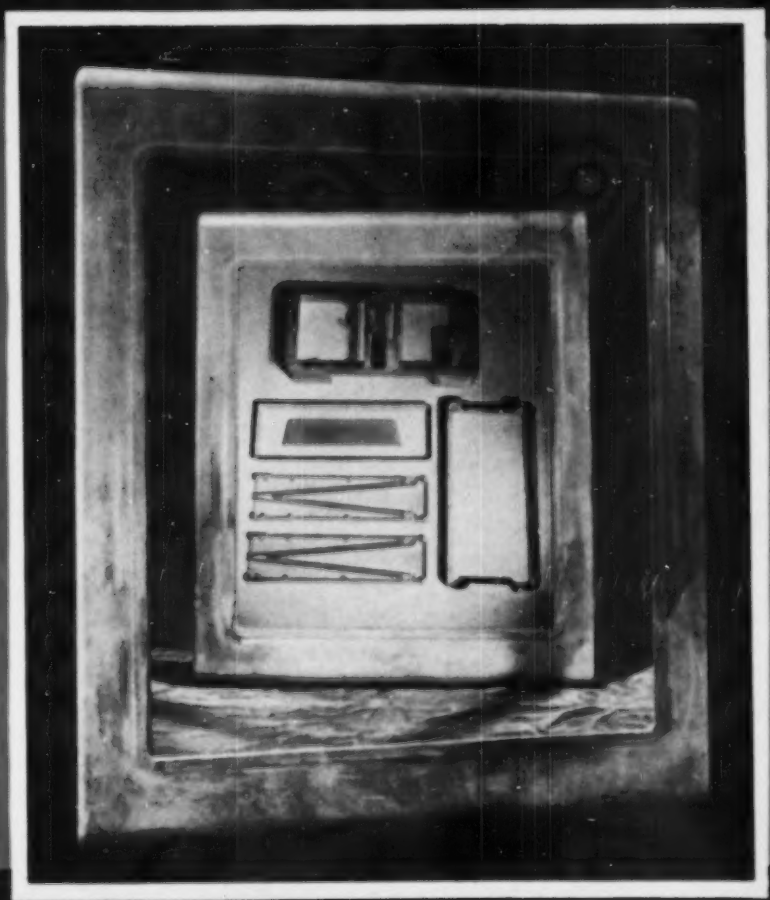
DIE CASTINGS

INCLUDING A SPECIAL FINISHING SECTION



November
1950

THE PRODUCT DESIGN MAGAZINE FOR USERS AND POTENTIAL USERS OF DIE CASTINGS

more than ever before be sure you know

VELVAGLAZE

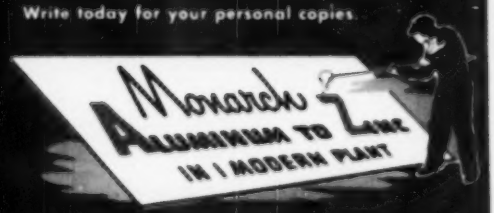
FOR: *Aluminum Permanent Mold Castings*
Aluminum Die Castings

THESE 2 NEW FOLDERS GIVE YOU THE VELVAGLAZE STORY

They are interesting, informative, non-technical—

- Tell how VELVAGLAZE processed aluminum die castings reduced a prominent manufacturer's finishing costs by 50%.
- Tell how the VELVAGLAZE process makes aluminum permanent mold castings brighter, smoother, more durable.
- Help progressive design and marketing executives solve today's complex problems.

Write today for your personal copies.



DIE CASTING

is a moving picture of one economy after another

CASE HISTORIES FROM MT. VERNON FILES

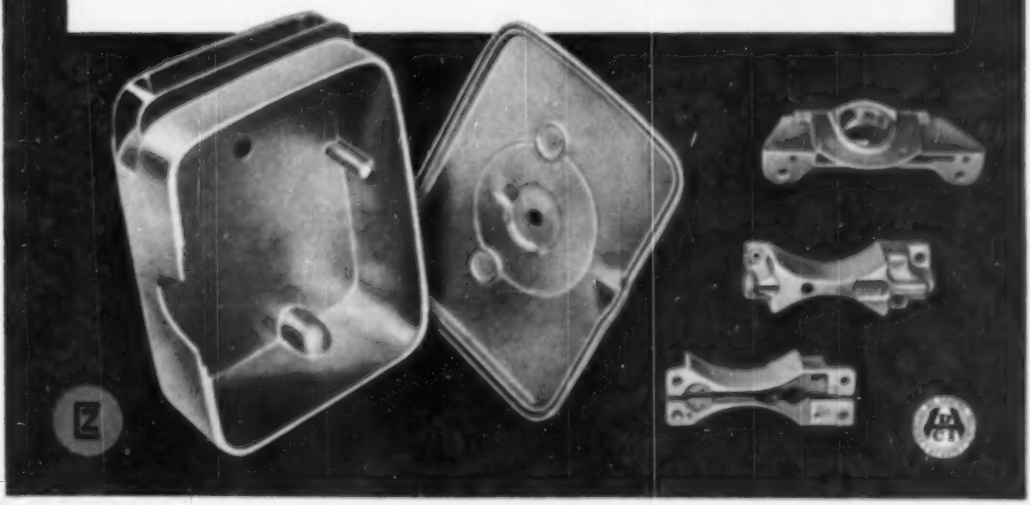
Run over any production picture that features die casting — and you'll find ECONOMY stars in every cast.

Here's a movie camera that testifies to that — and what's better than a movie camera for showing the evidence? Listen to it expose its views:

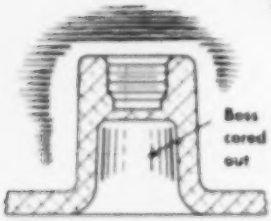
"Since I'm made by DeJur-Amsco Corporation to give perfect service anywhere on earth, and 'precision' is my middle name, every component part of me has to be strong, durable, and accurately produced. Not without due respect to economy, however . . . my field being a highly competitive one.

Because of this, my 2-piece housing, lens mount, and film gate block are all die cast. Die casting not only rapidly produces the intricate shapes, bosses, channels, slots and holes required, but furnishes these components so accurately that smooth operation and complete light-tightness are assured by precision fit of the parts. Even the critically uniform path required for the film as it passes through the gate, takes a minimum of machining to finish. Thus die casting saves time, material, money — while making possible a quality product."

Which gives good reason for focusing on die casting when next you consider a production procedure. And remember, we at Mount Vernon — who produced the parts mentioned above — have a wealth of accumulated experience and modern facilities . . . are always glad to make recommendations based upon your specific needs.



How to get the mo$t fo$ Zinc Die Ca$ting D$ar!



$ SAVE METAL

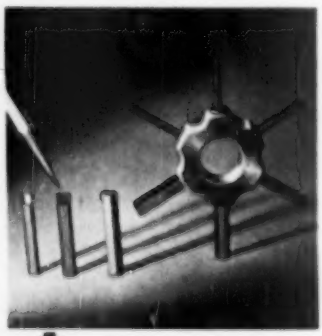
Remember that studs and bosses can be accurately cast in place, thereby providing a highly economical means of fastening a ZINC Die Casting to a mating part. Designers also find cast bosses useful as locating points for subsequent machining operations, to act as spacers, to serve as ejection points, or to equalize stresses. If heavy bosses are called for, you can save metal (without sacrificing strength) by coring them part way, as shown above.

The reason you are using—or will use—ZINC Die Castings in your products is just this—they do the best job at the lowest possible cost. As with any other material or manufacturing method, however, the true economy of ZINC Die Castings can only be realized through skillful adaptation of the design to the process. On this page you will find several hints to help you get the most for your ZINC Die Casting dollar.

For additional information along these lines ask us—or your die caster—for a copy of "Designing For Die Casting".

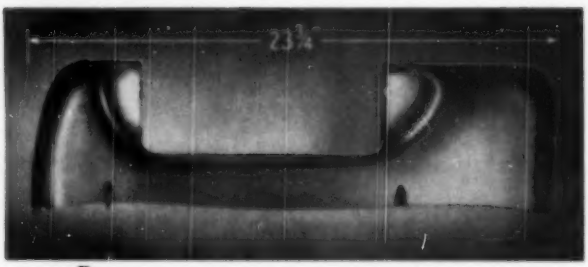
The New Jersey Zinc Company
160 Front St., New York 7, N. Y.

ZINC
FOR DIE CASTING ALLOYS



$ USE INSERTS

The six individual steel wrenches (for socket screws) are cast as inserts in the above tool. By partially flattening the ends of these inserts (see pencil) before insertion in the die, permanent anchorage is assured when the ZINC Alloy is cast around them.



$ GET IT ALL IN ONE PIECE

You can keep down your handling and assembly costs by incorporating as many features as possible in a single casting. Consider, for example, the above ZINC Die Casting which, with a mating half, forms an entire washing machine wringer frame—complete with cast assembly elements. The unusual castability of ZINC Alloy permitted the complex contours and the transition from thick to thin sections.

The Research was done, the Alloys were developed, and most Die Castings are based on

HORSE HEAD SPECIAL (99.99+% Uniform Quality) ZINC

DIE CASTINGS

BY

Stewart

40 YEARS OF SERVICE TO INDUSTRY

MACHINING AND FINISHING

Dimensional precision, beyond normal die casting tolerances, may create the need for subsequent finishing operations, the scope of which is usually determined by selecting the most economical method. Stewart's machining and finishing facilities permit you to tie your cost factors together—can be relied upon for the most exacting requirements.

Services available to you at Stewart's

- Designing
- Engineering
- Die Making
- Metallurgical Control
- Most modern Die Casting Equipment
- Complete machining, polishing and assembly facilities

We invite inquiries concerning all Die Casting problems.

STEWART DIE CASTING

Division of Stewart-Warner Corporation

[illegible] Fullerton Avenue, Chicago 39, Illinois
[illegible] Austin Street, Bridgeport, Connecticut

We take pride in being known by the customers we keep

NOVEMBER 1950
Vol. 8 No. 11

DIE CASTINGS

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Tucker 6703

ABC ABP

COVER—A 67 percent reduction in number of parts and accelerated production mean good news for almost any company. Add to the above, improved appearance and longer life for the unit, and the result is the experience of the Torsion Balance Co. The company recently changed to die castings, after nearly a century of "hand making" analytical balances. Article on page 36.

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Acceptance under Section 34.64 P. L. & R. authorized.

The Magic Touch that Increases Sales!

The Ekotape Pla-mate (Model 109) manufactured by Webster Electric Co., Racine, Wis., on which the die castings illustrated are standard equipment.

Proper Material Selection gets close attention by the technical staff at Webster Electric. After the careful screening of all possibilities they decided on Madison-Kipp die castings for strength, lightness, eye appeal and value.

When you plan new products requiring metal parts, please keep us in mind. Please also remember to send full data to our home office in Madison.

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213 WAUBESA STREET, MADISON 10, WIS., U.S.A.

ANCIENS ATELIERS GASQUY 31 Rue du Marais, Brussels, Belgium, sole agents for Belgium, Holland, France, and Switzerland.

WM. COULTHARD & CO. Ltd., Carlisle, England, sole agents for England most European countries, India, Australia, and New Zealand.

- *Skilled in* DIE CASTING *Mechanics*
- *Experienced in* LUBRICATION *Engineering*
- *Originators of Really High Speed* AIR TOOLS

WHAT EVERY MAN SHOULD KNOW

about buying
DIE CASTINGS

SERVICE—Your die casting supplier must have the facilities for prompt shipment of finished castings, combined with a service organization to give you immediate consultation on design or production problems.

QUALITY—Your die casting supplier must have complete quality control from raw ingot to finished product to assure "on grade" castings at all times.

FLEXIBILITY—Your die casting supplier must have the ability to produce every type and size of casting in either zinc or aluminum alloys.

ECONOMY—Your die casting supplier must have the engineering experience and production know-how to produce quality die castings at the least possible cost.

Here at Newton-New Haven we have all of these. Are you getting the most from your present arrangement? You must make a comparison before you can know. Ask the Newton-New Haven representative nearest you or write us.

For more than 10 Years QUALITY has been synonymous with

NEWTON NEW HAVEN

THE NEWTON-NEW HAVEN COMPANY
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LETTERS TO THE Editor

GEAR SHIFT HANDLES

Please advise the names, if available, of sources for stock handles such as those for gear shift.—A. H. G.

The practice of producing die castings from stock dies is not as common as it is in the plastic moulding industry. Although there are companies which produce gears, pulleys and similar parts from stock dies, we do not know offhand of a source for stock gear shift handles. We are therefore turning this inquiry over to our readers.—Ed.

CONDITIONING ALUMINUM ALLOYS

We are interested in obtaining one copy of "Conditioning Aluminum Alloys for Electroplating" by Keller and Zelley which you referred to on page 85 of your August, 1950, issue.

If you cannot supply us with this article we would appreciate it if you could forward us information as to where and how we might obtain it.—P. J. W.

The article can be obtained by writing to the Journal of the Electrochemical Society, 235 West 102 St., New York 25, N. Y. In response to the number of inquiries we have received for copies of various articles reviewed in our Current Reviews section, we are starting the practice of including exact information as to where the complete article may be obtained.—Ed.

RECENT DEVELOPMENTS

I am preparing an article on recent developments in American die casting technique for the Italian magazine "Produttivita."

I would like very much to refer to your magazine for some of the most interesting developments in this field and wonder if you will kindly give me permission to use some of your material by quoting the source of information.

(Continued on Page 14)

FAYETTEVILLE, N. Y.

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MAGNESIUM PLANT

CLEVELAND, OHIO

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You Can Depend on PRECISION

Out of these seven Precision plants comes a never-ending stream of quality die castings to keep the production lines of industry moving to new high production peaks. Large and small users of die castings are assured of on-time deliveries of the best die castings they can buy.

Precision know-how in producing better die castings plus superior plant facilities can help you meet your production and sales quotas.

Better Die Castings
in ALUMINUM • MAGNESIUM • ZINC

OVER-SEAS AFFILIATION. PRECISION offers the only over-seas affiliation with the Wolverhampton Die Casting Co., Wolverhampton, England, largest commercial die casting company in the British Isles or on the Continent. Our arrangement permits exchange of certain outstanding developments in size and finishing processes on both sides of the Atlantic.

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CORED HOLES for GEAR SHAFTS

Held to Close Tolerances in DIE CAST Gear Housing for Signal Electric Fans

The die cast gear-case and cover pictured above are used in several models of Signal Electric Fans. The use of die castings in this application has been an important factor in keeping costs in line, and in the performance of the fan assembly.

One problem in die casting this gear housing is the need for extremely close tolerances (.002 of an inch) in the cast-in holes for the gear shafts. Casting these holes eliminates two precision boring operations, cuts assembly time, and reduces overall costs.

According to the customer, Milwaukee Die Castings are specified for this gear-case and cover because they have proved highly satisfactory over a period of years. You, too, can count on Milwaukee for die cast parts that will contribute to the excellence of your product.

MILWAUKEE DIE CASTING COMPANY
1019 N. FOURTH STREET • MILWAUKEE 3, WISCONSIN

LITERATURE AND SERVICES OFFERED IN THIS MONTH'S ADS

NOTE: Circle numbers on the enclosed postcard to indicate literature, samples or trial services you wish to receive.

A-1. ACROMARK COMPANY. Literature is presented on hand and motor driven models of the Acroprinter, a machine for filling recessed letters and designs on die cast parts with enamel.

A-2. ALMCO DIVISION, QUEEN STOVE WORKS. Almco Supershoon barrel tumbling equipment is described in a folder now available. Also offered is information on Supershoon Engineering Clinics, a nation-wide network of engineering clinics that offer sample processing.

A-3. DETROIT POWER SCREWDRIVER CO. Illustrations and descriptions of assembly aids, including power screwdrivers, fixtures, nut drivers and hopper units, are listed in a catalog offered by the company to help solve production screwdriving problems.

A-4. DIVERSEY CORP. A cleaner, No. 505, that conditions the surfaces of zinc die castings prior to plating while removing unwanted deposits is described in literature available.

A-5. HYPREZ DIVISION, ENGIS EQUIPMENT CO. Samples of the company's laminated lapping stick for use on die casting dies are offered by the company.

A-6. ENTHONE, INC. Literature is offered by the company showing the uses of, and giving operating instructions for, Enthone Emulsion Cleaner-75.

A-7. GRIES REPRODUCER CORP. Besides offering bulletins on its production facilities in the field of small zinc alloy die castings, Gries Reproducer offers samples of its work. The company specializes in the production of tiny die castings.

A-8. LITEMETAL DICAST, INC. Literature and design information on aluminum and magnesium die castings are available.

A-9. MITCHELL-BRADFORD CHEMICAL CO. A catalog explaining the company's Black Magic process for putting black finishes on zinc die castings is available.

A-10. MONARCH ALUMINUM MFG. CO. The company's new Velvaglaze process that

(Continued on Page 10)

to be sure

the WELBILT STOVE COMPANY
uses **FEDERATED** DIE CASTING METAL

The Welbilt Stove Company, Inc., Mayeth, N. Y., is one of the world's leading manufacturers of popular price gas stoves.

Welbilt quality and volume demand that parts be consistently perfect. *To be sure* of this the burners in each of their thousands of ranges are die cast of a Federated aluminum alloy.

Federated aluminum-base die casting alloys are produced under strict metallurgical control . . . in accordance with ASTM, SAE, AMS, US Navy and US Army specifications . . . and are therefore guaranteed always to be of high purity and uniformity.

For die casting metals, or for help with die casting problems, see Federated first.

Federated Metals Division

AMERICAN SMELTING AND REFINING COMPANY · 120 BROADWAY, NEW YORK 5, N. Y.

DEPENDABLE
BETTER METHODS
SUPER CAST
DIE CASTINGS
BETTER DIE CASTINGS
SINCE 1919

The meaning of a signature!

Through a quarter of a century of knowing how, the Super Cast reputation for Better Methods—Better Die Castings, has been recognized.

Sound engineering, metallurgical knowledge and skilled techniques have achieved and maintained a standard of superior quality.

Super Cast has kept faith, always deserving the mark it bears. Super Cast means die castings for those who want the best.

A sound, time-tested institution and a sound time-tested product have won confidence and widespread endorsement.

DEPENDABLE
BETTER METHODS
SUPER CAST
DIE CASTINGS
BETTER DIE CASTINGS
SINCE 1919

THE SUPERIOR DIE CASTING COMPANY

1001 London Road CLEVELAND 10, OHIO

Detroit Chicago Pittsburgh
Philadelphia New York

LITERATURE AND SERVICES

(Continued from Page 8)

helps solve casting problems is described in two booklets offered by the company. The first is, "Here's how you can cut die casting finishing costs" while the second is, "Good news for design and product engineers."

A-11. D. J. MURRAY MFG. CO. Finishes will be put on sample parts sent to the company. Marco tumbling barrels are used to burnish, deburr, clean and polish metal surfaces.

A-12. NEW JERSEY ZINC CO. "Designing for Die Casting" is the title of a booklet now being offered by the New Jersey Zinc Co. The book shows how to realize greater economy from the die casting process through adaption of the design to the process.

A-13. OAKITE PRODUCTS, INC. The company offers a booklet showing the advantages of their product "CrysCoat" and lists ways in which it can be used for metal cleaning and preparation.

A-14. PARKER WHITE METAL & MACHINE CO. How the company assures its customers of die castings that meet specifications is explained in an illustrated booklet discussing Parker's 16 Point Production Control program.

A-15. RING VALVE CO., INC. An automatic shot control unit that minimizes porosity in die castings and produces a sound, hardware finished surface that can be plated without buffing is described in literature available from the company.

A-16. ROTO-FINISH CO. Information on the use of Roto-Finish barrel tumbling processes to finish die cast parts is available. Sample processing and a processing report can also be obtained.

A-17. G. W. SMITH & SONS, INC. Samples of Die Slick, an easy-to-use die lubricant that prevents sticking even on complicated dies, are offered by the company.

A-18. UNITED CHROMIUM, INC. Literature is offered on how to give zinc die castings corrosion resistance, sparkling finish and good paint adherance by using the company makes new nickel anodes from

A-19. WAGNER BROS., INC. How the company makes new nickel anodes from nickel scrap is explained. Full directions for packing and shipping and quotations are available.

Over 80,000 Square Feet of Modern Plant

PARAGON DIE CASTINGS are all the name implies—excellent in structure—outstanding in appearance—unsurpassed in design.

Our modern plant has every facility for precision workmanship that reduces assembly and machining costs to an absolute minimum.

PARAGON

ALUMINUM AND ZINC BASE DIE CASTINGS

Consult any of the offices listed below or write us direct for information on how to increase the salability of your product by die casting.

QUALITY PARAGON CAST DIE CASTINGS

PARAGON DIE CASTING COMPANY

5853 WEST DICKENS AVENUE CHICAGO 39, ILLINOIS

SALES OFFICES: DETROIT • INDIANAPOLIS • MILWAUKEE • CHICAGO

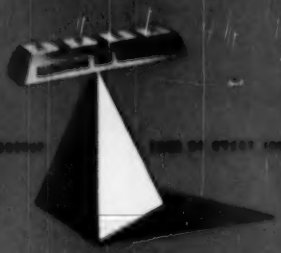
APEX

ALUMINUM • MAGNESIUM • ZINC BASE

DIE CASTING ALLOYS

Dependable high quality die cast alloy ingot—an important factor in production for dependable die castings—made to exacting specifications—complete Spectrograph and Quantometer control from raw material to the finished alloy—assuring uniform composition—less production problems—more customer satisfaction

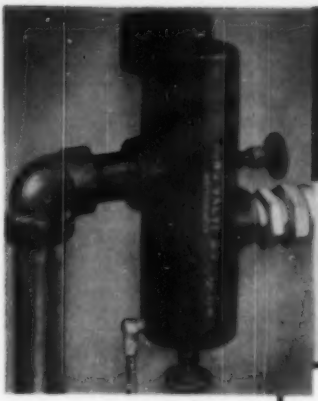
Buy the Best—Buy APEX.



APEX SMELTING COMPANY

[illegible]
CHICAGO 23, ILLINOIS

[illegible]
CLEVELAND 5, OHIO



Get RESULTS like this on Your DIE CASTING MACHINE!

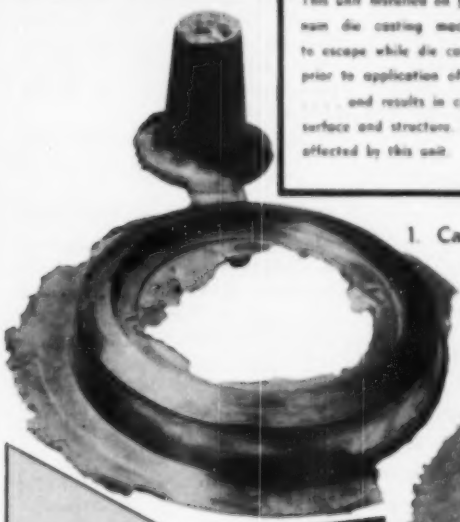
with RING Automatic SHOT CONTROL UNIT

This unit installed on your zinc or aluminum die casting machines permits air to escape while die cavity is being filled prior to application of full line pressure . . . and results in castings with better surface and structure. Cycle time is not affected by this unit.

. . . Regulates your Shot from 1" to Full Stroke at Variable Speed . . .

SECURES BETTER SURFACE, BETTER STRUCTURE

Substantial savings in fewer rejects, better finish, reduced wear and tear on machines, longer life of "gooseneck," result in higher production of better castings . . . and enables this unit to quickly pay for itself on your machines!



1. Casting as it came from machine

2. Same casting plated direct from machine without trimming, polishing, or buffing!

These Unretouched Photographs Tell the Story!

The above photographs have not been retouched . . . they indicate the quality of casting you get when Ring Shot Control Unit is installed. The unit is simple, trouble free, easily installed and quickly adjusted to the specific job. It has only one moving part . . . and is built to outlive the machine!

Mail Coupon Below for Descriptive Circular!

RING VALVE CO., Inc.
CLAWSON • MICH.
Telephone Lincoln 2-3387

RING VALVE CO.,
Clawson, Mich.

Gentlemen:

Please send descriptive circular and data on your Ring Automatic Shot Control Unit.

Name _____

Title _____

Company _____

Street _____

City _____ Zone _____ State _____

"...and using this mix on each shot we got 9 castings before one stuck!"

Don't risk getting stuck with "part time" die lubricants. Standardize on Die Slick: it works *all the time*. Now used by 78% of all die casters, Die Slick is inexpensive; but most important, it saves many times its cost—consistently prevents sticking, scoring, and soldering—eliminates down time—assures high production all along the line.

Moreover, it assures good surface finish, often eliminates plating and finishing problems before they start. It comes in one, five, and 55 gallon containers—in five grades to suit all requirements.

Try a week's supply of Die Slick on your most difficult jobs. Simply specify quantity, and the type of alloy on which you will use it. If you are not completely satisfied, simply return the invoice unpaid.

start every job with **DIE SLICK**

the industry's standard die lubricant

G. W. SMITH & SONS, INC., 5403 Kemp Road, Dayton 3, Ohio

LETTERS TO THE EDITOR

(Continued from Page 6)

In case you have no objection, I will give you a list of the articles I intend to use. As soon as my article is published in Italy, I will have some copies of it forwarded to you for your files.—F.B.D.

Permission granted.—Ed.

24 WAYS

I would appreciate a reprint of your article "24 Ways to Avoid Trouble in Die Casting Design" in the September issue. Also, when available, I would like reprints of the rest of the series.—S. B.

Tear sheets forwarded.—Ed.

ELECTROPLATING INSTRUCTION

In Die Castings for September 1950 you note that Joseph B. Kushner Electroplating School has a course called "Electroplating Know How."

I would appreciate your either forwarding this letter to Mr. Kushner or sending me his address as I am interested in his course.—H. O. W.

Address of Mr. Kushner's school is 115 Broad St., Stroudsburg, Pa.—Ed.

LIST OF BRASS SOURCES

We note on page 4 of your October issue that you have a list of die casters producing Brass die castings, and we would thank you to send us a copy of the list.—E.L.F.

List forwarded.—Ed.

ANNEALING FOR STRESS RELIEF

If available, may we have a reprint or "tear sheet" of the following article: Annealing for Stress Relief, by N. F. Ritchley & P. A. Berghorn in Die Castings, Vol. 5, Dec. 1947—p. 28, 43-45.—C.E.G.

Tear sheets forwarded.—Ed.

Do your designers and buyers know this...?

. . . in two modern plants, Alcoa makes the best aluminum die castings money can buy

You can avoid production headaches by making Alcoa your die-casting supplier.

Alcoa recommendations are based on 35 years of die casting and 62 years of experience in aluminum. You'll find them *economically* sound, for we never forget that your product must be sold competitively.

You'll like Alcoa *dependability*. Deliveries when promised. Specifications met or exceeded.

You can find us listed under "Aluminum" in your classified phone book.

Or write: ALUMINUM COMPANY OF AMERICA, 1895L Gulf Building, Pittsburgh 19, Pennsylvania.

ALCOA DIE CASTINGS

ALCOA ALUMINUM

Since the inception of die casting the automotive industry has been, by far, the largest user of zinc alloy die castings. This is not surprising as ease of casting and finishing, as well as the physical characteristics of zinc base alloys, provides the ideal metal for automotive hardware and a great variety of functional parts.

ZINC ALLOY DIE CASTINGS

Percent of 1949 Sales by End Uses
(Based on Estimates of AMERICAN DIE CASTING INSTITUTE covering Jobbing Die Casters only)

INDUSTRY & PRODUCT	% POUNDS SHIPPED
Transportation—Motor Vehicles	54.4
Household Appliances, Furnishings, Equipment	22.4
Mining, Construction, Agricultural Machinery, Commercial Machines & Equipment	8.4
Plumbing, Heating & Builders Hardware	5.4
Office Machines, Photographic, Optical & Scientific Instruments & Equipment	3.7
Communication Equipment, Electronic & Timing Devices, Clocks, Vending Machines, etc.	3.3
Sporting Goods, Jewelry, Toys, etc.	2.4

Other industries have found similar advantages in the adoption of zinc die casting for their respective products. This is evidenced by the fact that nearly 75% of all die castings by weight are based on zinc.

- **DIE CASTING is the Process**
- **ZINC, the Metal**
- **BUNKER HILL, the Preferred Zinc**

BUNKER HILL 99.99+% ZINC

EASTERN SALES AGENTS ST. JOSEPH LEAD COMPANY 250 PARK AVENUE, NEW YORK 17
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THERE'S A REASON WHY

Since 1930 so many
Customers who discriminate
Have always selected
Us as being their most
Logical and reliable source
To supply quality
Zinc alloy die castings

A TRIAL WILL CONVINCE YOU, TOO,
OF THE DIFFERENCE

SCHULTZ DIE CASTING COMPANY
1810 CLINTON STREET • TOLEDO 7, OHIO

Can You Top this?

Second Furnace on Order

The Chemalloy Foundry Company of Louisiana, Missouri, specifies Stroman M C Dip-Out Furnaces

Here is actual proof that Stroman M C Reverberatory Dip-Out Furnaces for aluminum have the effect in actual operation that we claim. They are a combination of melting and holding furnaces that produce the highest quality casting and always have hot metal available for shipping. They are ideal for permanent mold, die casting, or sand casting plants. Bath capacities range from 500 to 10,000 pounds. Jim Maddern of Chemalloy says the rest. Install a Stroman M C in your plant and turn these savings into profits, while making working conditions much more pleasant for your men!

CHEMALLOY FOUNDRY COMPANY

LOUISIANA, MISSOURI

June 14, 1950

Gentlemen:

We have just finished ... and have come ... are pleasantly ... as sure ... others.

... auditing department ... and figures which to ... pleased them on as I ... your furnaces compare to ...

... aluminum furnace we bought from you a year ... of the finest investment we ever made. Here are ... of operation on the M C and former pot equipment for ... with a production schedule of a monthly melt of 200,000 ... a 100,000 lb. yield. We found that pot furnaces cost ... as follows:

Labor	$5200.00
Fuel Labor	3400.00
Total	8000.00
	2750.00
	$21,350.00

The one ... we are now operating ... costs as follows:

Refract...	...
Fuel	...
Dir...	...
	...
	...
	470.00
	$8870.00

... in one year's time with one furnace, needless to say. Also, our men find it much ... around, and it gives us a happier personnel. ... on the design of such a fine piece of equipment, and ... from now on all our furnaces will be Stromans.

Very truly yours,

CHEMALLOY FOUNDRY COMPANY

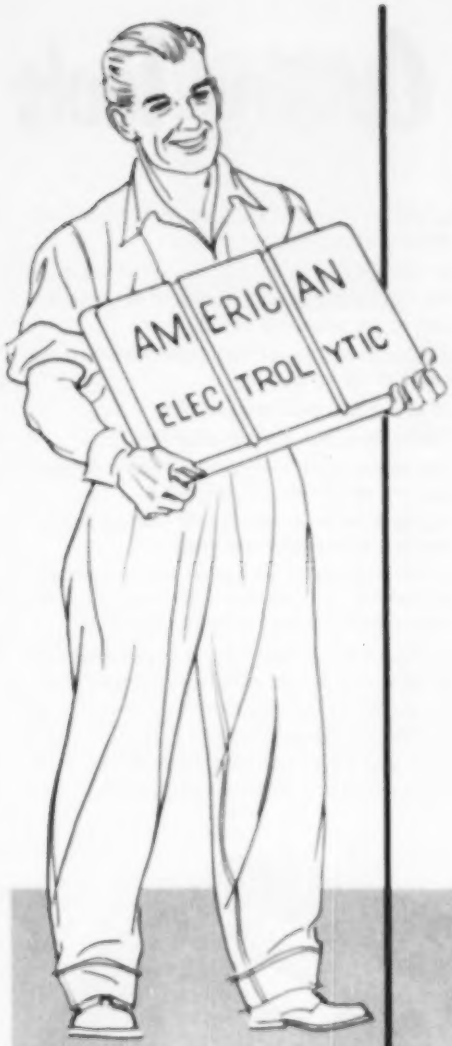
James Maddern
President

JM:er

STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. • 9900 FRANKLIN AVE. • FRANKLIN PARK, ILL.



AMERICAN
ELECTROLYTIC

99.99+%
SLAB
ZINC

FOR QUALITY PRODUCTION

A RELIABLE SOURCE

FOR DIE CASTING

REQUIREMENTS

AMERICAN ZINC SALES CO., Distributors
for AMERICAN ZINC, LEAD & SMELTING CO.
Columbus, Ohio
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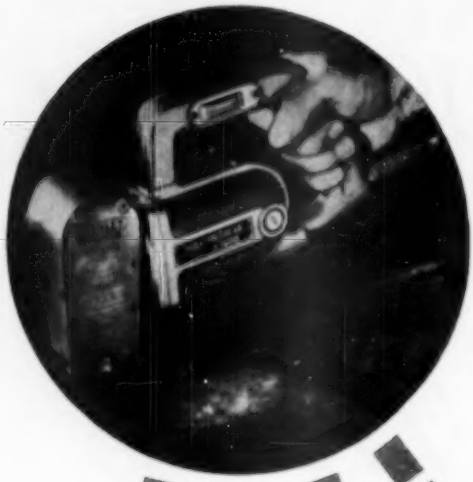
Cutting Costs on Cutting Tools

A CASE HISTORY:



Stanley Unishears cut steel, but Stanley Electric Tools, New Britain, Conn., cut costs.

Prize example is the new Unishear No. 214-A, made with five Hoover die castings instead of the sand castings used in the preceding model.

Stanley engineers report that—due wholly to the advantages of die castings.—

Material costs have dropped 41%

Direct labor costs have dropped 19%

Machining rejects are fewer because the die castings are uniform in size and shape

Styling is better because the die castings provide smooth surfaces and clean detail

Direct and related savings are expected not only to absorb the die costs within five years, but to return at least 20% per year on the investment

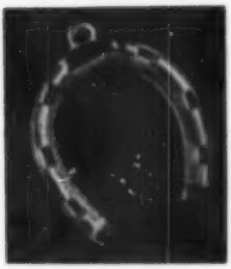
Perhaps Hoover die castings—backed by Hoover's 28 years of experience and its complete engineering, design and production service—can reduce the costs or improve the sales appeal of *your* product. It's certainly worth looking into. Just ask a Hoover sales engineer to call on you. There's no obligation.

HOOVER

SPECIALISTS IN THE FIELD OF DIE CASTINGS

THE HOOVER COMPANY

Die Casting Division, North Canton, Ohio



GADGETS:

small attention-getters

ONE of the big drawbacks in the use of direct mail advertising is the problem of getting the recipient to read the letter that you send him. The New Yorker magazine is not alone with its file of "Letters we never finished reading." A good many men in businesses and professions are so pressed for time that such communications often are deposited in the circular file with no more than a brief glance. This means a loss in time and money for the sender of the letter, and he must still find a method of contacting the prospect.

One answer to this problem is the use of "gadgets," a device now being promoted by the National Research Bureau, Inc., Chicago, Illinois. An organization which provides business services, the Bureau has recommended gadgets to its subscribers as a means to get "1) greater attention value, 2) greater reminder value, 3) higher circulation after delivery."

The gadget itself is a small object fastened to the letter, usually at the top. It will ordinarily have some tie-in with the copy content of the letter, and will have a tricky phrase next to it to stimulate immediate interest.

A good example is the letter shown on this page. The gadget is a die cast horseshoe, 1/16-inch thick and about 1 inch long, and weighing only a fraction of an ounce. Next to the gadget is the lead line "We were lucky to attract your attention." The rest of the letter follows, but the attraction is the gadget and the line which runs smoothly into the body of the letter.

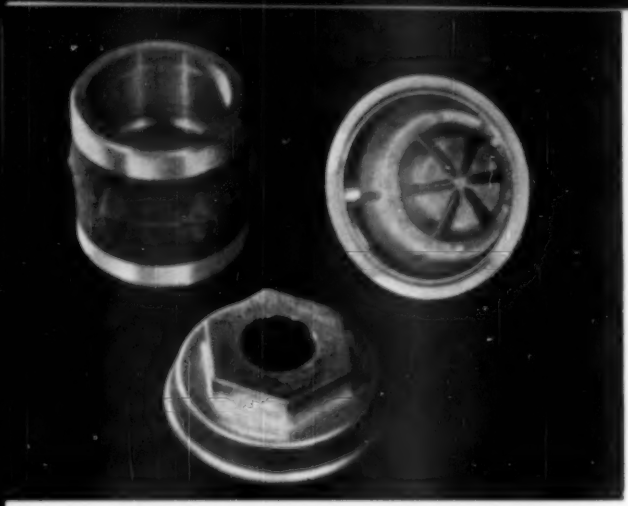
The small die casting on this letter is a miniature horseshoe. More than a million of these horseshoes were used on letters sent out by a charitable institution. Many other small die cast parts are similarly used on attention-getters on form letters.

Other examples include a letter from a chemical company to its retailers, which features a small pair of scissors glued to the top of the page, with the line, "Cut your sales resistance"; and a circular from a business newspaper, trying to get across the idea that it provided its readers with "mental leverage," which had a small bottle opener attached to the page.

Gadgets are made

(Continued on Page 42)

WHERE



1. ALL EXPOSED METAL surfaces are die cast in zinc alloy because of its resistance to corrosion, as is demonstrated by the extensive use of hot dip galvanized in the food packing industry. Hub caps in zinc alloy also have high impact resistance. The metal hub for the Neotread truck wheel is die cast in aluminum because of its higher melting point. This hub is subjected to 375F for several hours while the rubber and neoprene wheel is being molded over it.

HAND trucks used in the food processing and meat packing industries are subjected to such severe operating conditions that special materials have had to be selected for their construction.

These vehicles are exposed to extremes of temperature as well as to moisture, brines, animal fats and fatty acids, grease and chemicals. In a typical cycle, a hand truck is loaded in a room where the temperature is about 130F. It may remain at this temperature for several hours, after which it is rolled into a freezing tunnel where the thermometer shows 20 below. The loaded truck stays here for as long as 72 hours before going into the cooler for unloading.

Then the truck is thoroughly cleaned, inside and out. This is usually accomplished by the use of live steam, hot water and a detergent. Sanitary regulations of the U. S. Department of Agriculture must be strictly followed.

Under the conditions described here, it is apparent that the durability of truck wheels has presented a serious problem. Rust and corrosion of metal parts, and the deterioration of

Die Castings are often used where one of these

CORROSIVE AGENT	SALT WATER	GAS and OIL	CHEMICALS
DIE CAST APPLICATION	Partially submerged in water and intermittently wetted and dried, the die cast aluminum housings for outboard motors are an outstanding example of the corrosion resistance of aluminum die castings when exposed to salt (or fresh) water. These castings are usually given a phosphate or chromate treatment before applying a baked synthetic paint. Lamp housings for yatch lights are often produced of die cast zinc and given a copper - nickel - chrome plate.	Nozzles for gasoline hoses and internal pumping and metering devices used in gas pumps are commonly built of zinc die castings. Even though used in direct contact with the liquid, these zinc die castings are seldom given any protective chemical treatment. Grease guns, caulking compound tips and a variety of garage tools have untreated zinc die castings in their construction.	High speed electric motors de signed especially for rayon-pro ducing operations, are housed in uncoated aluminum die cast ings, even though the chemical drip and condense directly ont the metal surfaces.

CORROSION IS MOST SEVERE

Designed to operate under conditions of extreme heat and cold, and exposed to grease, oil, animal fats, blood and salt brine, these truck wheels for the meat packing industry have die cast hubs and hub caps.

rubber treads or tires, have necessitated excessive maintenance, repair and replacement.

However, a combination of materials and manufacturing techniques worked out by St. John & Company of Chicago, manufacturers of food processing equipment, has resulted in a durable, strong and smooth-riding wheel especially suited for food handling trucks, but also useful for general material handling equipment.

These Neotread ball bearing wheels, Figure 1, consist of a die cast aluminum hub over which is molded a wheel core of a hard rubber-fibre compound. To the circumference of this unit is bonded a neoprene cushion tread. The wheel is thus a solid unit, permanently molded together so that there are no air spaces or cracks which can gather dirt or moisture.

A specially designed cartridge type ball bearing is pressed into the die cast hub and locked in with retaining rings. Over the inner and outer ends of the hub are fastened a pair of die cast zinc hub caps, with a pair of rubber "O" rings to seal the bearing assembly.

The choice of materials has been made with the strict qualification that all parts must be able to withstand corrosion, as well as to perform mechanically.

Thus, the rubber, fibre and neoprene which compose the

(Continued on Page 41)

s a problem!

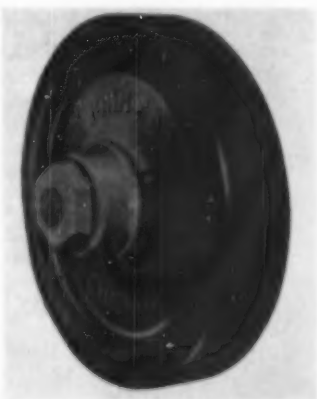
FRESH WATER

Lawn sprinklers and hose nozzles are large volume items being successfully die cast in both zinc and aluminum alloys. These are sometimes left raw, or may be painted for store-appeal. Another place where zinc die castings are performing outstandingly is the drain valve of domestic washing machines, while die cast aluminum is specified for some washing machine agitators. Hot, soapy water comes into contact with these pieces.

PERSPIRATION

Door handles, drawer pulls, and a wide variety of knobs and dials which are exposed to the corrosive action of perspiration and grease, are die cast in zinc. Many of these are left unprotected, but where the darkening effect of grease or sweat is objectionable, a dip, paint or plating application may be introduced.

2. UNITARY CONSTRUCTION of this Neotread truck wheel, with rubber molded directly onto the die cast aluminum hub, eliminates crevices which might admit dirt or corrosive liquids.



IN AN effort to prepare for the possibility of an emergency, the Ordnance Department, U. S. Army, has directed the Frankford Arsenal to compile a list of

FOR DEFENSE

available die casting facilities and their capacities.

The aid of the American Die Casting Institute was solicited, and questionnaire cards were mailed by the A.D.C.I. to all known die casting facilities. Although the response to this questionnaire has been gratifying, the possibility is recognized that some firms were not included in the mailing list, or that, in the press of business, some die casters may have lost or forgotten the card.

A few of the firms contacted have failed to reply, and they have been requested to do so as promptly as possible. Those die casters who have not received a card, or who have misplaced the one mailed to them, have been requested to fill in the form printed below and forward it to the American Die Casting Institute at 366 Madison Ave., New York 17, N. Y.

This information is being solicited in the interests of national defense. The Ordnance Department must have a list of those die casters able to undertake procurement quickly in case of an emergency. Producers have been assured that this information, much of which is of a "trade secret" nature, will be given the *security classification "Confidential,"* and will not be disseminated.

The following instructions are given for use in filling out the questionnaire:

Question 1:

Fill in the number of die casting machines in your plant, segregated by the type of metal cast. If you cast only zinc,

(Continued on Page 40)

Seek List of Die Casting Facilities

IF YOUR PLANT has die casting equipment, and you have not yet filled out the questionnaire printed below, you will be aiding defense plans if you will fill it out now and send it to the American Die Casting Institute.

This information is being collected for and will be submitted to FRANKFORD ARSENAL and will carry the security classification: "CONFIDENTIAL"

AMERICAN DIE CASTING INSTITUTE
366 MADISON AVENUE NEW YORK 17, N. Y.

SURVEY OF DIE CASTING MACHINES AND CAPACITY

	MAGNESIUM MACHINES (See Special Note Below)					ALUMINUM MACHINES: Cold Chamber			ALUMINUM MACHINES: Gooseneck			All Other Machines ****
	Now in Use	Idle	*Converted to Aluminum	In Use 1942-43	Maximum Availability†	Now** in Use	Idle	In*** Use 1942-43	Now in Use	Idle	In Use 1942-43	
1. Number of Die Casting Machines												
2. Area of Maximum size die casting producible	in.²	in.²	in.²	in.²	in.²	in.²	in.²	in.²	in.²	in.²	in.²	
3. Weight of maximum size of die casting producible	lbs.	lbs.	lbs.*	lbs.	lbs.	lbs.**	lbs.	lbs.***	lbs.	lbs.	lbs.	
4. Approximate Total Monthly Production	pieces	pieces	pieces*	pieces	pieces	pieces**	pieces	pieces***	pieces	pieces	pieces	
5. Approximate Total Monthly Production	lbs.	lbs.	lbs.*	lbs.	lbs.	lbs.**	lbs.	lbs.***	lbs.	lbs.	lbs.	

Note: * Give data in terms of Magnesium.
** Include converted Magnesium machines with data in terms of Aluminum.
*** Do not include converted Magnesium machines in this column if included under Magnesium machines table.
**** Number of machines only.

†Special Note: If you are willing to die cast Magnesium indicate in column headed "maximum availability" the total number of machines, etc., that you would be willing to operate.

Company _____

By _____

Address _____

Date _____

24 ways to avoid trouble in Die Casting Design

(PART THREE)

By HIRAM K. BARTON

BOTH cast iron and brass are normally replaced by zinc base alloys, though brass die casting sometimes replace equivalent sand cast parts when very high mechanical strength is needed.

As zinc alloy die castings are three or four times as strong as the usual run of cast iron products, there is always scope in such conversions for thinning wall sections and reducing weight.

Many cast iron components are given an inexpensive wrinkle finish, and this is equally applicable to die castings without any pre-treatment except degreasing. The smoother surfaces of the die casting may, nevertheless, effect such an improvement in product appearance that it is preferable to change to a smooth type of finish, and it is then desirable to adopt a phosphatizing or equivalent treatment before applying the organic finish. These treatments produce an inactive surface film that inhibits corrosion and improves adhesion of the enamel or lacquer.

When die castings replace sheet metal components it is usual for assembly to be facilitated, for the modified component may include tapped bosses, integral studs or rivets and threaded inserts for securing the casting to a mating part. Where none of these is applicable, it is useful to remember that many cold-working operations can be performed on die castings, and spinning or swaging often provide a satisfactory means of joining two components, one or both of which are die cast. The disposition of bosses, studs or inserts about the component is a matter to be undertaken with care, for such features if badly placed may make a more complicated die necessary and so increase tooling charges. Wherever possible

FIGURE 15

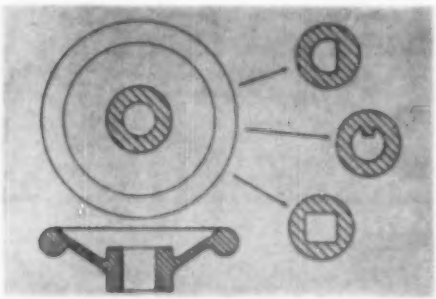


FIGURE 15. IT IS FREQUENTLY POSSIBLE to produce several castings that differ only in some internal detail—the size of a bore, the shape of a cored hole and other features of the kind—merely by providing a set of different cores that can be mounted interchangeably in one die. Thus the hand-wheels shown at left are all produced in this way, separate cores being used to produce the circular, flatted, square and keyways bores.

FIGURE 16

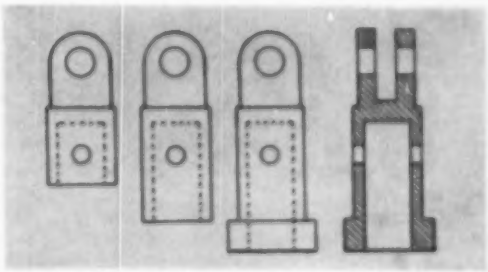


FIGURE 16. VARIATIONS OF EXTERNAL FORM can be provided by interchangeable cores in suitable instances. The three different forms of pivoting tube-socket shown at right are cast in the same die. One of these has a short, plain stem, while the other two have a long, plain stem and a long, flanged stem, respectively.

To form the first two the core has a shrouding collar that stops off the portion of the cavity forming the flange. In this case the cores are slideable, the axis of the casting lying in the plane of the parting line.

FIGURE 17

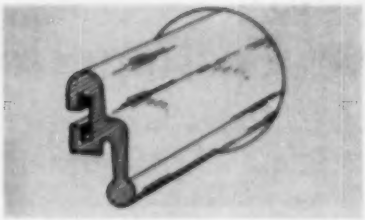
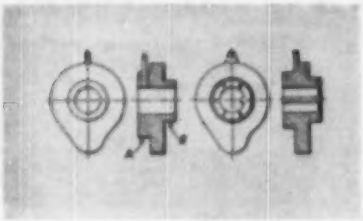


FIGURE 18



FIGURES 17 AND 18. EXTRUDED SECTIONS, particularly those in light alloys, are much more adaptable than drawn bar stock, which is normally restricted to simple geometrical forms. Extrusion provides very complex profiles at a relatively low tooling cost, and is therefore well adapted to the production of components which are substantially flat, even though of irregular form in plan. Thus a valance fitting is merely cut from the extruded stock shown in Figure 17 to the required width of ¼ inch and burnished to remove the slight burrs at the edges, no machining being required. Any departure from an even thickness, however, calls for additional machining operations and so increases production costs.

This is shown in the small cam of Figure 18, which was machined from extruded stock. The external form gave the required face profile with sufficient accuracy, but it was necessary to size the bore and to machine on both faces, reducing the diameter to form two unequal bosses. One of the bosses had also to be drilled at right angles to the axis to take a small pin to which a light coil spring was attached, while a hole (not shown) had to be tapped in the same boss to take a grub-screw securing the cam to the shaft. This last method was adopted as an alternative to more positive methods of location because there were six possible radial positions for the high point of the cam.

In converting the component to die casting there was, of course, no difficulty in producing the two unequal bosses and in coring the central hole so nearly to size that a burnishing punch mounted in the trimming die brought it to the designated dimension. It is of more interest to note that the pin to anchor the coil spring was eliminated by casting a tiny cored lug on one side of the cam, slightly offset from the working face (Figure 18, right). But the most important modification, and one that enormously simplified assembly by removing the need for a setting jig to fix the radial positions of the several cams on the shaft, was the provision of an indexing core forming an integral key in the bore. This core could be located at will with the slot forming the key in any of six positions, and small raised numerals 1 to 6 were cast on a recessed annular face at one end of the cam. In effect, therefore, the die produced six different cams, the changeover taking only a few seconds, and at assembly it was only necessary to mount the cams on the shaft (under a long-stroke mandrel press) in a predetermined though variable order. The shaft had only one long, straight keyway milled down it, but any combination of cam sequences was instantly achievable and the engraved numerals opposite the integral keys provided a visible check on correct angular location. In this conversion die casting paid off handsomely, not by reducing the actual production cost, for there was little to choose between the two methods on this point, but by enabling assembly methods to be simplified and speeded.

---

they should be located with their axes parallel with that of the cored recesses in the component, since they will then be formed in one of the main die members or in a sliding block that is already required for core operation. If placed at right angles to an uncored face additional slides will probably be required to accommodate them. All in all, these are design features that should only finally be decided upon in consultation with the die caster.

These aids to easy assembly are not restricted to products consisting wholly of die castings, but can just as well be adopted for joining die castings to parts produced by other means. In appropriate applications, however, the die casting operation may itself be used as a means of assembly. This is possible when one or more parts of the assembly can be laid in the die as inserts and the injected metal then cast around them to form a permanent union. Notable examples of this method of assembly are seen in electrical appliances, where the laminae of both rotor and stator elements are frequently locked into a rigid unit by injecting metal around and through the stack of thin steel sheets. Magnetic pole pieces are also located in and secured to die cast dynamo housings in the same manner. Although the inserted elements are usually of a metallic nature, this is not necessarily essential; such non-metallic materials as laminated wood and paper have both been used successfully in this way without any deleterious effect on their structure or properties.

In the brief product design analyses accompanying this article, it has only been possible to highlight some of the most

FIGURE 19. THE SUCCESS OF THE SMALL INDIVIDUAL CAMS shown in Figure 18 led to the adoption of die casting for a similar application in the same mechanism, the main difference between the two being that in this new application the angular position of the various cam faces was fixed. These actually were not true cams, but trip levers. Originally these had been produced individually—and set individually at assembly—in much the same way as the rocker cams.

In converting to die casting, however, there was no functional reason why the whole line of trip levers should not be formed as a single unit, and a design for the assembly was worked out. In order to maintain a flat parting line in the die, the projecting arms of the levers were formed between thin steel plates let into slots crossing the main cavity at right angles. A steel rod was laid in the die before casting to replace the shaft to which the levers had previously been assembled. This was not knurled in any way to anchor the casting, since the pressure exerted was so small in normal service that the natural shrinkage of the metal provided sufficient resistance to turning.

FIGURE 19

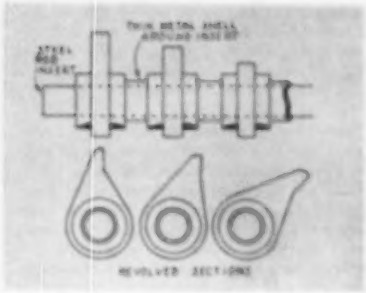


FIGURE 20

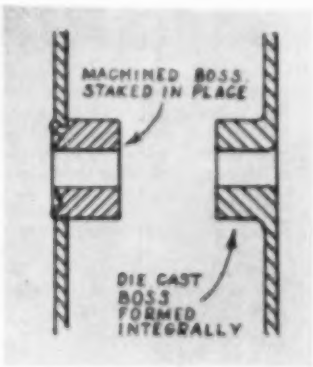


FIGURE 20. ALTHOUGH SHEET METAL PRESSWORK is cheap and speedy, offers a variety of materials and illimitable surface finishes, it is noteworthy that nearly a quarter of all conversions to die casting are of products that were previously produced from stamped or drawn components. Partly this is due to the much thinner sections with which die castings can now be commercially produced, making them often comparable in this respect with the sheet metal parts that they replace, but mainly because of two salient advantages that cannot be duplicated in pressework. These are the ability to reproduce detail in thin raised line and the practicability of varying the section thickness from point to point within the product. Neither is practicable in a sheet metal component; where trademarks or commercial insignia, for example, are required to be formed on a stamping they must always be of bold section and well radiused. Similarly, if a small bearing boss is needed in a drawn cup it must be produced on a screw machine and assembled in a separate operation.

FIGURE 21

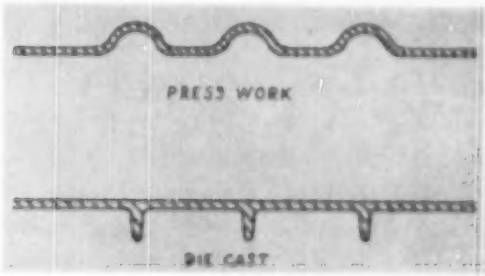


FIGURE 21. FROM THE FUNCTIONAL ANGLE, die castings offer, section for section, greater rigidity than is obtainable in pressework. This is because stiffening ribs can be located internally to strengthen stressed portions of the surface, whereas no such provision can be made in sheet metal parts. By corrugating or beading the sheet added stiffness can be attained, but a comparison of the equivalent structural features in Figure 21 will show that the surface appearance is always affected. Moreover, the ribs on a die casting impart greater mechanical strength than the equivalent sheet metal formations do.

widely applicable ways in which the flexibility of the die casting process can be utilized to cut production costs, and the methods discussed have mainly been chosen because they cannot be closely parallelled in other manufacturing processes.

Because of this they are often overlooked by designers whose usual field of interest lies in components produced by other means, with the result that the full advantages of conversion to die casting are not realized.

FIGURE 22. BOTH FLAT STEEL springs and coil springs may be used as inserts, in the latter case, as in the flexible brush-head of Figure 22, the die cast portion must be provided with a hole through which a core can pass to locate the end of the spring and block the hollow center. The spring must be close-coiled and although a thread-like flash is usually formed for one or two turns this readily breaks away.

It will be appropriate to consider at this point a rather different type of insert, which although flexible in itself forms part of a rigid assembly. Woven wire, either flat or formed to shape, can readily be incorporated as an insert in die castings and the assembly provides a cleaner, stronger and more permanent union than can be obtained by trapping the wire between sheet metal beads, the usual method.

In early attempts to produce strainers and filters in this way some difficulties were encountered from the tendency of the metal to throw a flash inward over the wire mesh, for this was almost impossible to remove. This trouble can be obviated, however, by applying varnish to the woven wire and so blocking the mesh. The edges that are to be cast into the frame are masked before varnishing, and after casting the varnish is removed from the filter with a suitable solvent.

FIGURE 22

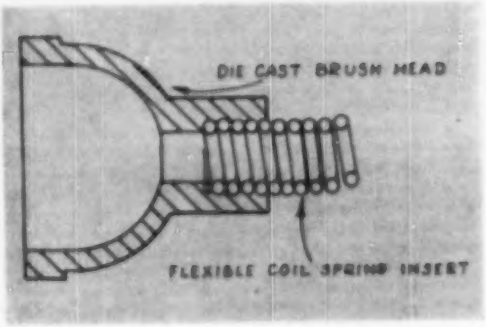


FIGURE 23

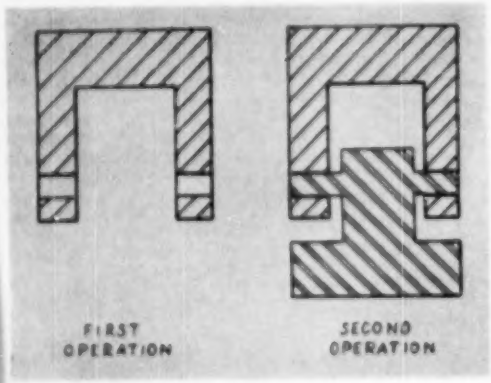


FIGURE 23. HINGED ASSEMBLIES CAN BE PRODUCED in a variety of ways, some of the processes being protected. Most of them require that one of the hinging elements be produced first, whether as a die casting or not, and this component is then laid in the die as an insert.

Metal is then injected into the die to form the other part of the assembly, including an integral hinge-pin projecting through a pre-formed hole in the first element. Shrinkage of the hinge-pin on cooling is sufficient to allow the two parts to pivot, though it is often desirable either to apply a graphite coating to the pre-formed hole or to cast a hardened bush in place within it.

FIGURE 24

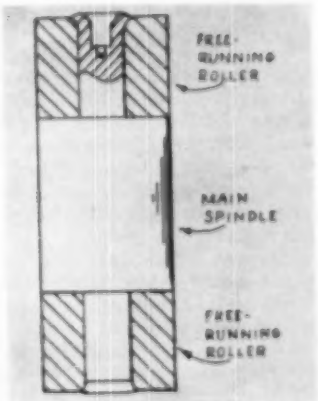
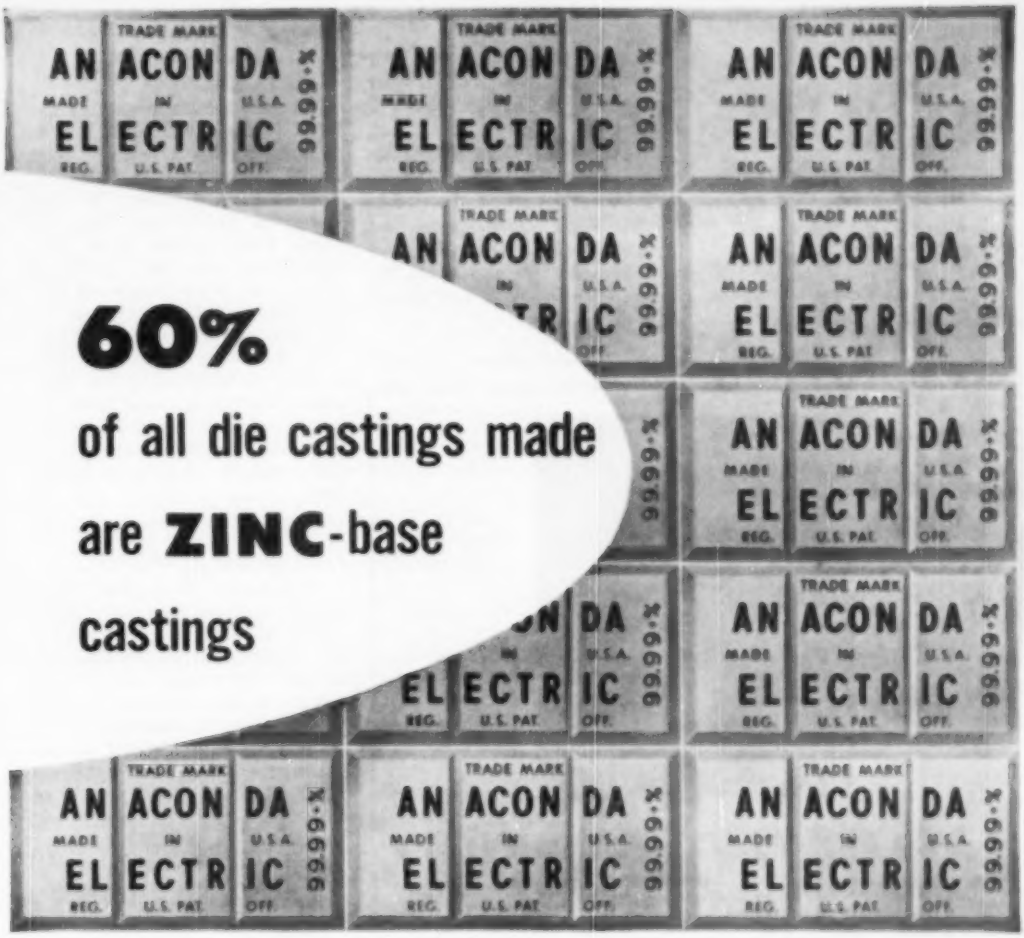


FIGURE 24. ANOTHER METHOD OF DIE CASTING a hinged assembly, developed by the writer, involves the use of a "packaged hinge unit" which is placed in the die as an insert, the two parts of the assembly being cast around it simultaneously. The form of the insert is as shown, consisting of a steel rod reduced in diameter at both ends and with free-running rollers secured to the reduced diameters. The cavities for the two parts of the assembly are positioned in such a way that the central rod becomes united with one and the two rollers with the other.



The strength and corrosion resistance of zinc; the smooth, easy-to-paint, easy-to-plate surfaces which are characteristic of zinc-base die castings; the ease and speed with which zinc-base die castings can be produced, have earned for zinc its predominant place in the die casting industry.

Absolutely requisite, however, is extreme purity of the zinc used. Anaconda is a dependable source of dependable Electric* Zinc, 99.99+% pure — always! Anaconda does not make die castings, but supplies ANACONDA Electric Zinc, 99.99+% pure, to the die casting industry. Anaconda Sales Company, 25 Broadway, New York 4, N. Y. Subsidiary of Anaconda Copper Mining Co.

*Reg. U.S. Pat. Off.

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NAMED CHIEF ENGINEER

R. H. Keck has been appointed chief engineer of the Aurora Metal Co., Aurora, Illinois, according to G. B. Peters, vice president of the company. Other appointments announced at Aurora were W. R. Baughman as sales manager, and J. W. Lauder as metallurgist. The company manufactures brass die castings.

NEW PLANT TO MAKE DIES

A new plant scheduled for completion by the end of October is being built for the Tool-Die Engineering Co., Cleveland, Ohio. The new plant will be located across the street from Tool-Die's present plant and will contain some 4,000 square feet of floor space. It will be used for making die casting dies. The company makes zinc and aluminum die castings.

WEST GERMAN PLANT OBTAINS FAIRCHILD LICENSE

Rights in Germany for the use of the Al-Fin process of molecularly bonding aluminum to ferrous metals have been granted to Metallgeselischaft, A. G., of Frankfurt am Main, by the Fairchild Engine and Airplane Corp., Farmingdale, N. Y. The agreement with the Frankfurt firm is the third foreign license granted by Fairchild, whose Al-Fin division developed the process, according to M. V. Little, general manager of Al-Fin. Metallgesellschaft is one of Europe's larger non-ferrous metal working combines, operating mines and smelters as well as foundries.

NAMED ASSISTANT

Walter C. Troy has been named assistant chairman of the metals research department of the Armour Research Foundation at Illinois Institute of Technology, it was announced by Dr. Carl E. Swartz, chairman of the department. Troy received his bachelor's degree from the University of Notre Dame and later attended Carnegie Institute of Technology.

APPOINTED SALES ENGINEER

Gerhard E. Verstagen has been made an equipment sales engineer by the Hanson-Van Winkle-Munning Co., Matawan, N. J. Mr. Verstagen attended the Universities of Buffalo and Michigan, where he studied mechanical and hydraulic engineering. Mr. Verstagen will be attached to the company's Chicago office.

ELECTED TO BOARD

Ralph S. Euler, senior vice president of the Mellon National Bank and Trust Co., has been elected to the board of directors of the Allegheny Ludlum Steel Corp. His election to the Allegheny Ludlum board fills a vacancy created by the death on September 5 of Mr. William F. Detwiler.

Is It Luck? Or Is It Skill?

Probably horseshoe pitching will never be classed as a science. Yet it is more than luck that puts one "ringer" on top of another. It's know-how and years of experience which produces champions.

Nor is it luck that *UDICO* customers are scattered through more than half the states in the Union. In fact over 75% of all our castings are shipped east of the Mississippi River.

All production is under the rigid requirements of the Certified Zinc Alloy Plan of A.D.C.I.

For over a quarter of a century UNION DIE CASTING CO., LTD., has led in new developments and die castings of the highest quality.

UNION DIE CASTING CO., Ltd.

2313 East 51st St. Los Angeles 58, Cal.

MEMBER OF AMERICAN DIE CASTING INSTITUTE

A COMPARISON OF COMMERCIAL DIE CASTING MACHINES

(PART TWO)

By W. J. DURING
Vice-President and General Manager
Precision Castings Company, Inc.

Construction Improvements

Basic machine construction has improved through the use of better materials, increases in size of pressure absorbing members, more bushings and replaceable wear plates, as well as greater tendency to build stronger than the rated tonnage rather than weaker.

Die platens are now made of steel castings well ribbed and heavy in sectional thickness, with long, large bearings for greater resistance to movement and wear on the tie bars and the toggle pins. Tie bars are of heat treated alloy steel with sufficient ductility to resist breakage under stress, having 160,000 to 190,000 P. S. I. tensile strength.

Die locking toggles, generally used because of their positive, powerful, mechanical action have been increased in size and improved in design to properly absorb the high locking pressures now required of machines. This is also accomplished by some machine designers in direct hydraulic cylinders using prefill tanks to eliminate line surge and facilitate rapid cylinder filling. Great strength is obtained through use of a two way design, for the toggle in its locking position forms a figure "H" or a figure "X", thus absorbing all locking pressures along four straight lines. Compact and rigid in construction, here again steel castings are used for links, and large diameter heat treated alloy steel pins operate in special bushings.

Cold chamber plungers and wells are now normally being made of nitralloy steel with far greater life. Beryllium copper plungers have also to some extent been successfully used.

Nitralloy steel is also used for the sleeve or bushing in the bore of goosenecks, and this along with one piece design and heat resisting iron construction has actually given goosenecks far longer life, with many reported lasting as long as two years under constant usage. Plungers, as well, are made from nitralloy steel and when equipped with heat resisting cast iron rings also have far greater life than previously could be expected.

Where plunger rings are used, however, subjected as they are to the heat, and acting as a pressure seal against the metal, they become the wear member, but as they are by far the least expensive to replace, it is more economical to obtain long gooseneck and plunger life even if rings have to be be replaced every 80 to 100 operating hours. Although there are many schools of thought on plunger ring design, one which has proven to provide a better seal for a longer period of time is the split ring which is expanded hydraulically by the metal entering a small hole at the bottom of the plunger and then through a cross hole to the plunger ring groove.

In order to do the enormous job of die casting parts of every conceivable size and shape, within strict specifications as to surface finish and dimensional accuracy, the contract die casting industry has had to install or build a wide range of die casting machines and equipment.

The complete gooseneck—plunger—nozzle unit, on present machines, is usually supported by a steel bridge mounted on the side frames of the machine, thus no strains are placed upon the furnace or melting pot into which the gooseneck is independently suspended. The complete unit can be easily and quickly adjusted by means of draw bolts, so that the nozzle will stay in perfect contact with the die.

Hydraulics Versus Air

The greatest number of commercial machines being built today are constructed with complete self - contained hydraulic systems. Completely air operated machines, particularly for smaller sized pieces of equipment, and some machines

* This is the text of an address presented before the Midwest Group of the American Die Casting Institute, April 11, 1950.

built for connection to central hydraulic systems, are being produced, but definitely in negligible quantities. Completely air operated machines can be equipped with an electrical control mechanism with automatic timing for controlling the cycle speed. These machines, although they are extremely fast and as a rule have a lesser installation cost, have operating failings which tend to make them compare unfavorably to self-contained hydraulic machines. More horse power, size for size, is by the way required for an air operated machine. Too violent a motion is imparted to the operating cylinders as against the smooth functioning of hydraulics, and the constant maintenance of the various air valves, cylinders, etc., which tend to rust and stick, are just a few imperfections.

The self-contained hydraulic machine has been steadily improved so that today the hydraulic unit is far less complicated and much more foolproof. Through use of seamless steel tubing leaky joints are under better control. Most machines have increased the size of the hydraulic pump being used to far greater capacity so that much more volume of oil at high pressure can be obtained to speed up the operating cycle of the machine. Although there is some equipment using 2,000 and 3,000 lb. P.S.I. systems, the trend seems to be for more and more use of 1,000 lb. systems and far greater life with far less maintenance results. As P.S.I. pressures are doubled, i.e. 1,000 lbs. P.S.I. as against 2,000 lbs. P.S.I. maintenance seems to quadruple in direct proportion. The only advantage of having higher P.S.I. pressure systems is to obtain more pressure at the end of the injection plunger during the injection of the metal, and this can be more readily procured through use of a pressure multiplier.

Most of the present day machines are equipped with necessary gaskets required for use with non-flammable oil which is daily being used in more and more machines. Even though the cost of the non-flammable material, such as lindol, is considerably higher than ordinary oil, the danger of a fire which is always possible when inflammable oil is being used, becomes negligible with the use of non-flammable material. Although there has been some question in the past as to the effect non-flammable materials have upon valves and pumps, experience in the last few years has tended to prove that with proper gaskets these hydraulic parts require no more maintenance than normal.

The majority of present day hydraulic systems contain the necessary valves for connection to core pull cylinders. These cylinders can then be operated by an electric push button or, automatically, through use of timers, at the correct, desired time in the cycle of the machine. Through use of electric switches mounted on the core pull cylinders, it is possible to have complete safety so that core pins are either pulled or pushed in at the correct time in the cycle of the machine, preventing accidents to the die which often occurs when an operator who is manually controlling the cores moves the pins in or out at the incorrect time.

The Electrical System

Inasmuch as most new machines are electrically timed and push button controlled, with adjustable timers for setting the correct casting cycle, much of the fluctuation of die casting speeds has been eliminated. Where the operator previously had to judge for himself the correct chilling time of the casting and how long to hold the casting under injection pressure, this is now done for him automatically, resulting in much more uniformity of the castings being produced, far less rejection and greater overall hourly production.

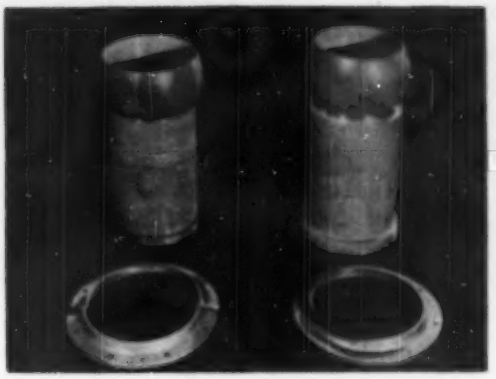
The electric systems have been greatly improved with all of the wiring, necessary relays, timers, switches, etc., contained within a sealed panel box protecting this mechanism from dirt, water, oil, or molten metal. Most systems have also been greatly simplified so that circuits can be traced, and troubles located quickly by the average electrician. When one compares the present compact simple electric systems on machines to some of those of the past where the panel board was half as large as the machine, with a multiplicity of electronic tubes, complex switches, and seemingly miles of wiring, the importance of simplification cannot be stressed too strongly.

Last and most important is the fact that today's machines are a thousand per cent safer than in the past. Every safety precaution that has been developed is put on machines to prevent injection of molten metal while the die is open, to prevent closing of the die while the operator's hand is between the two die faces, to prevent any exploding of goosenecks or other parts containing molten metal, and to prevent as much as possible fire hazards. The result has been a greatly lowered accident rate on die casting equipment, which is

(Continued on Page 71)

FASTER PRE-PAINT TREATMENT

For large volume of die cast zinc and aluminum and stamped steel parts, manual dipping proved to be too slow for Bonderizing parts prior to painting. Sunbeam Corporation then introduced an automatic, conveyorized unit for spray Bonderizing parts and increased output by 100 percent.



IMPROVED WEARING QUALITIES are given to aluminum by means of a new hard-surfacing process. These aluminum ball-and-socket assemblies have been given a hard coating on the outside of the ball joint and the entire surface of the collars. Although this particular assembly is not die cast, two die castable alloys can be successfully hard-surfaced by this method.

Hard-Surfacing for Aluminum Suggests New Uses for Die Castings

A PLACE in a field dominated up to this time by high-strength alloy steels, surface-hardened carbon steels and chromium-plated steels is promised for aluminum by a new finishing process now being developed at the Glenn L. Martin Co., Baltimore, Maryland.

The addition of abrasion resistance to already valued properties such as lightness, high tensile strength and corrosion resistance, should open a wide, new field for aluminum die castings. Although it should be emphasized that the process, called the MHC hard coating, is still largely in the experimental stage, enough information does exist to give product designers some idea of what may be expected of it in the future.

It is with this in mind that the editors of Die Castings present the following survey.

WHAT IS THE MHC COATING?

The Martin MHC coating is a finish applied electrochemically to aluminum and aluminum alloys. It provides a non-metallic, file-hard, highly heat-refractive surface which is strongly bonded to the base metal. MHC can be applied only on a specific area of a part, if that is desired, by masking off the area where the finish is not wanted.

The finish gives the best results when applied on a smooth surface. The process has unusual throwing power, so that uniform coatings may be applied to irregular shapes and recessed areas; however, if grit blasting is employed for preliminary cleaning, care must be taken that small particles are not imbedded in the surface, as these will cause minute imperfections in the finish.

WHAT ARE SOME OF THE PRESENT AND FUTURE USES OF MHC?

The finish will be of use in almost any application where abrasion resistance is necessary, and aluminum is the desired metal. This will be especially true in the aircraft industry, where aluminum's lighter weight justifies its greater cost. It will also be true for industry in general, wherever the die casting process will create a sufficent saving in machining or other costs.

Martin has already substituted aluminum with an MHC coat for steel in the fabrication of a carburetor deck plate, and for cylinders, bearing surfaces, jackscrew threads (which would bind if left uncoated), door threshholds and mechanic's wrenches.

The process has already proved itself on a variety of items, including gears and pinions, surveying instrument parts, turbine impeller blades, hand tools, swivel joints, friction locks, cams and hydraulic pistons. Many applications for aluminum die castings immediately come to mind. Martin engineers have been carrying on laboratory development of the MHC coating for more than two years, and believe that the finish will find many more applications as industry acceptance grows.

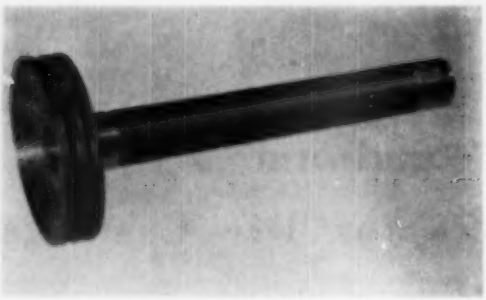
IS THE MHC PROCESS APPLICABLE FOR DIE CASTING USE?

As yet, experience in the treatment of die castings with the MHC process is very limited, however, it is known that certain alloys are suitable for coating while others are not. In general, those alloys having zinc or magnesium as the principal

alloying elements are satisfactory. Copper and silicon are undesirable if present in large amounts, the limit on copper content being about five per cent. Good results have been obtained with aluminum alloys 43 and 218, which can be die cast. Alloys 13 and 85 are unsatisfactory. Ability to receive a hard surface may be a determining factor in the choice of a die casting alloy for specific parts.

IS THE PROCESS SUITABLE FOR MASS PRODUCTION?

Although experience with the MHC coating is limited at the present time to laboratory and development work, it is the opinion of the Martin engineers that the process can be set up on a mass production basis.



BY AN ELECTROCHEMICAL TREATMENT, this aluminum hydraulic piston has been given a 0.0008 hard coating on the piston wall and ring grooves.

HOW DOES THE COST OF MHC COMPARE WITH OTHER COATING PROCESSES?

Information on the cost and range of equipment needed for production line MHC coating is not available at the present time. It seems safe to say that the cost will be comparable to the more expensive forms of decorative plating, and considerably cheaper than hard chrome plating.

WHAT DIMENSIONAL CHANGES, IF ANY, ARE INVOLVED?

Coating thicknesses vary from 0.0001 to 0.006, with a 0.002 film being used for most wear resistance applications. This standard thickness is from $2\frac{1}{2}$ to 20 times the thickness of the conventional anodized aluminum film. The electrochemical process provides a coating which is integral with the base metal.

Since the base metal participates in the reaction, its thickness is reduced by an amount in proportion with the thickness of the coating applied. Parts which are to be given the 0.002 film are normally processed to a minus tolerance of about one-half the thickness of the proposed coating.

WHAT CAN BE EXPECTED IN THE WAY OF HARDNESS AND WEAR RESISTANCE?

No accurate hardness values for the MHC coating have been obtained, because the indentors of the standard testing machines produce too deep an impression for reliable results. For purposes of classification, the coating can be considered to be approximately file hard.

Wear resistance is the most outstanding property of the MHC hard coating. In standard tests performed on a Taber Abrasion Tester, using rubber-bonded abrasive wheels with a 1000-gram loading, MHC samples showed half as much wear after 50,000 cycles as did cyanide case-hardened mild steel. At 100,000 cycles, the MHC samples still showed less wear than a sample with a hard chrome plate.

WHAT PHYSICAL CHANGES RESULT?

Tensile tests show that although the tensile and yield strengths of the materials are but slightly affected, there is some loss in ductility. This is not unusual for a coating of such high hardness. The film has good impact resistance, although it can be dented and slightly chipped under repeated sharp blows of a hammer.

The MHC coating produces a marked drop in the endurance limit or fatigue life of the material. This is usually the result when a hard coat is used over a softer base metal. When contemplating the use of the coat on a part subjected to repeated stresses in bending, tension or torsion, the designer should subject the coated part to functional tests to assure its suitability.

The MHC coating is a non-conductor, and is a good electric insulator. In voltage breakdown tests, the MHC coat showed a range of 500 to 3700 volts against an average of 340 volts for standard anodic films.

Thermal stability is affected, because of the difference in the rates of thermal expansion of the film and the base metal. When subjected to temperatures of over 200F., therefore, the film may be expected to check. The coating shows no tendency to spall, however, and its corrosion resistance is not materially affected by the checking. The treated surface will also provide a measure of protection for the base metal for a short time at extremely high temperatures.

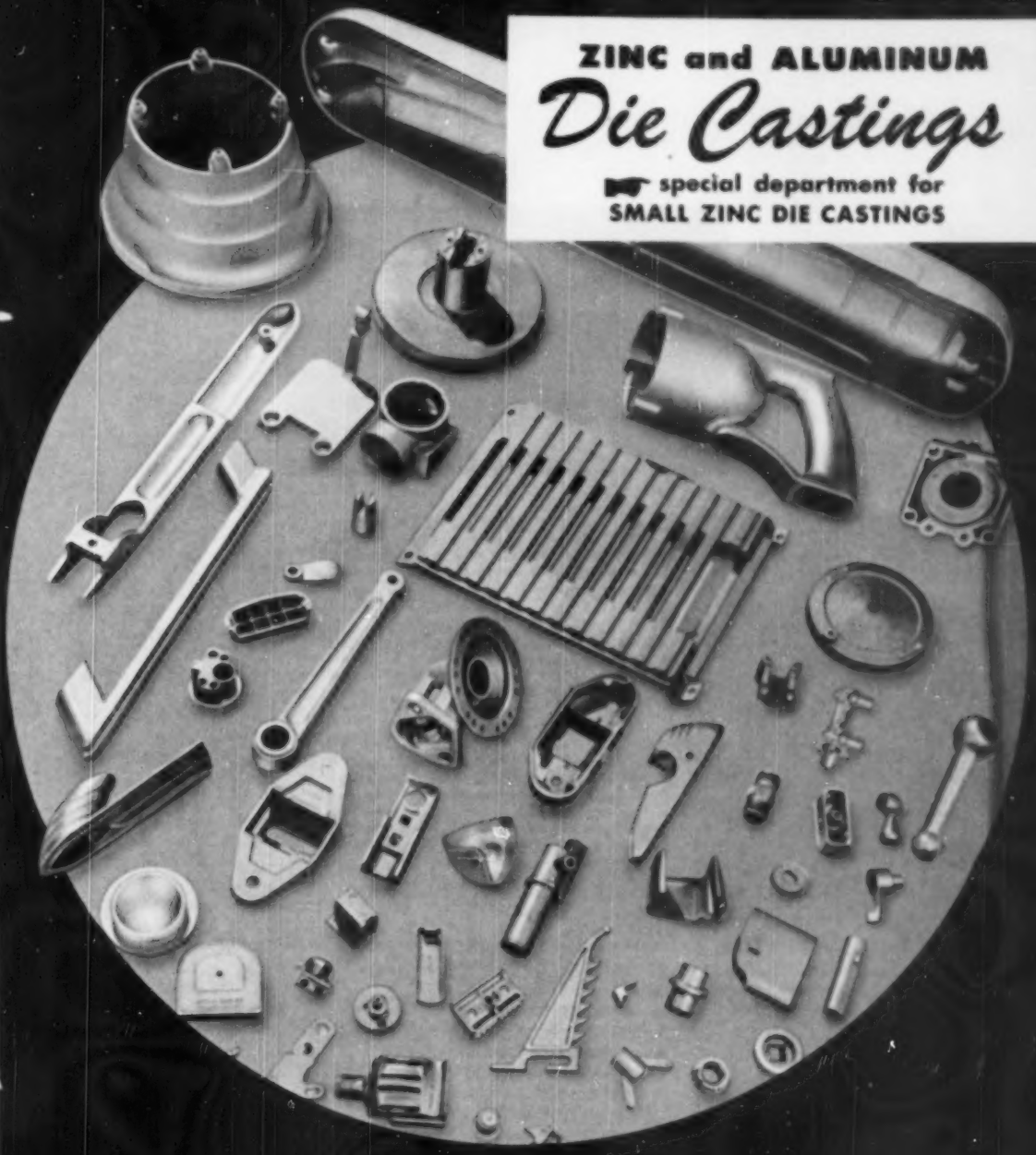
IS THE MHC HARD COATING CORROSION RESISTANT?

The coating is reported to have excellent corrosion resistance characteristics with regard to atmospheric and salt water corrosion. Test panels having a 0.002 coating have been subjected to 14 months of continuous exposure with very little evidence of corrosion resulting. Although proof against most of the common chemicals, the finish is attacked by strong acids and alkalies.

WHAT KIND OF APPEARANCE DOES THE COATING HAVE?

MHC coating is not in a class with chromium plating or with other plated metals from the ap-

(Continued on Page 40)



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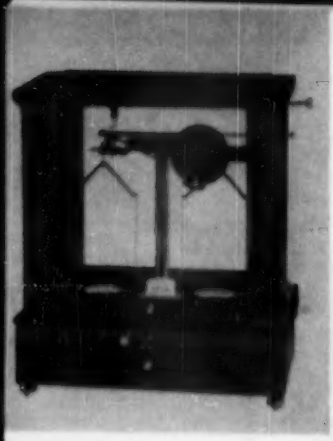
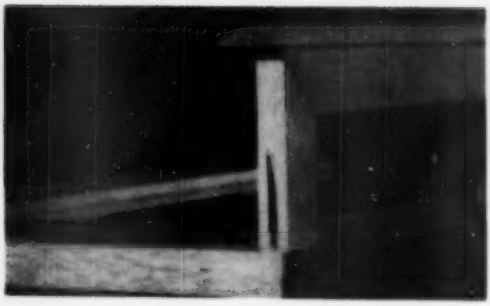
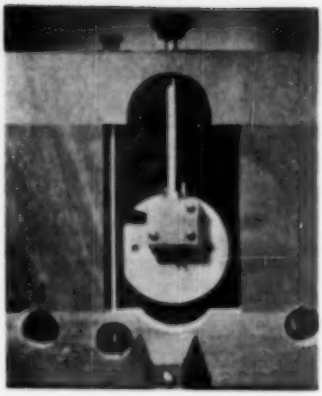






1. COMPLETELY HAND BUILT, the old-fashioned wood housing and base for an analytical balance, *above left*, required the work of a skilled instrument builder throughout.

2. LABOR INVOLVED in cutting, fitting and finishing a wooden unit was excessive, as can be seen in this detail view of a sliding door, *above right*.

3. HIGH RATE OF BREAKAGE resulted because it was necessary to mount the weighing mechanism directly on the glass plate (shown as a dark area) in the old models. Detail of underside, *left*, shows large amount of cutting and fitting involved in assembly of wooden base.

By R. G. NORDSTROM
Christian Becker Div.
The Torsion Balance Company

ANALYTICAL balances in the past have been manufactured on a "hand made" basis. One instrument maker would completely assemble the balance from the ground up and, in so doing, would perform the required building and fitting to obtain the proper setting.

This is the traditional approach to the fabrication of precision instruments and is completely out of line with present day manufacturing practices.

Modern methods and materials make possible a uniformity and consistency from part to part so that a high degree of precision can be achieved in assembly with a minimum of hand fabrication and manual adjustment.

In redesigning our analytical balances, after nearly a century of experience manufacturing them by conventional methods, we attempted to obtain interchangeability, a feature almost foreign to the analytical balance field.

We proposed and have been successful in assembling balances on a modified production line and then utilizing the skill of trained balance adjusters in the final adjustment. With the new design we have simplified the assembly operations and reduced by some 67 percent the number of parts required to make the unit.

Fundamental in redesigning the balance for efficient production was the development of base and housing which would be simpler to manufacture and, at the same time, permit improved construction of the balance. This has been accomplished by introducing eight aluminum die castings in place of the usual mahogany cabinet.

Redesign of the balance was carried out by an industrial designer, Carl Otto of New York, working in close cooperation with company engineers. Mr. Otto was responsible not only for appearance of the new unit,

EDITOR'S NOTE: Because of its unusual interest, the newly designed balance is discussed here by a representative of the company and the industrial designer responsible for redesign.

cation . . .

. . to Die Cast Aluminum

but also for a great many of the functional and structural features such as the redesigned vernier scale for greater legibility.

Basic principle of this balance is to have the weighing mechanism mounted to the base itself. In the past, when the balance was housed in wood, the entire mechanism, or stand assembly as it is called, was tightly screwed to the glass base plate itself.

Although a working surface other than glass would be desirable, no suitable substitute has been found since corrosion resistance is of utmost importance. Because small milligram weights are used, a black surface is necessary so that the weights may be seen when dropped. For this purpose a black Carrara glass has been found most desirable.

Obviously, the weighing mechanism, when screwed tightly to the glass, introduced production problems and resulted in a very disturbing breakage figure. Even the use of torque wrenches never completely solved the assembly problems; and certainly the damage in transit when such a heavy mass was screwed to the glass, was an ever-present problem.

For this reason, in the new balance, the weighing mechanism is secured to the die cast base. The ability to produce die castings that are strong, rigid and stable has permitted improved structural design.

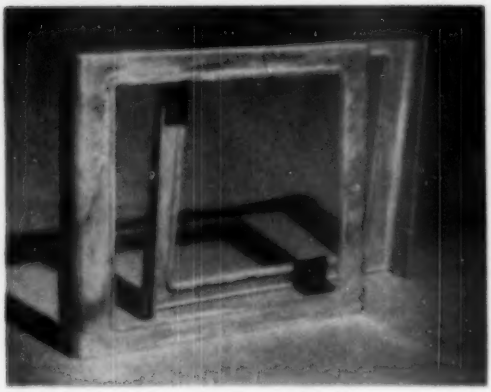
By this method, greater stability and the elimination of the broken glass hazard have been obtained. The new base consists of two die castings fastened together with machine screws. The lower piece has four upright bosses on which the weighing mechanism is mounted. The upper casting has a seat for the glass plate. Thus, although the support for the weighing mechanism extends through the glass plate, it is completely insulated from it.

The glass plate is mounted with rubber gaskets to act somewhat as a shock mounting. The glass is held by a special adhesive to the rubber and it, in turn, is cemented to the die cast base.

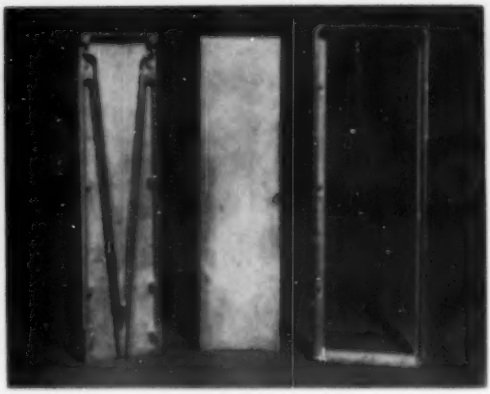
Ribbing of the base castings is so designed that a minimum of difficulty has been encountered in connection with warp-

4. SYMMETRICAL DESIGN of the new Christian Becker analytical balance makes possible makes possible interchangeable rights, lefts fronts and backs for lower tool costs. Ease of operation and high visibility for all functioning parts have been achieved by this design which features an all-die-cast housing.

5. NO BREAKAGE of glass occurs, now that a die cast base with four mounting bosses support the weighing mechanism. The glass plate is independently supported and cushioned by rubber gasketing. The base is built of two aluminum die castings.



3. INTERCHANGEABLE FRONT AND REAR door die castings help to reduce tool costs. They are cast rigid and flat, have an integral seat for the glass windows, and are easy to finish.



4. READY FOR ASSEMBLING with only a few minor drilling and tapping operations, these end pieces, *left*, and the top frame permit the use of a semi-production type assembly.

age. It will be noticed in the accompanying illustrations that sufficient top surface has been provided on the base casting to stiffen the piece and to allow room for mounting holes. However, a large portion of the top area has been cored out to save metal and weight without affecting the strength of the base.

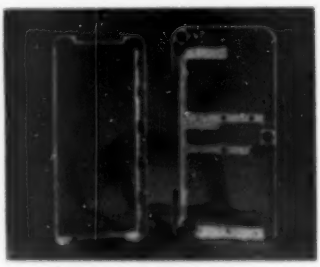
The castings have also been designed to minimize the amount of machining required. These include a few milling, drilling and sanding operations.

A close-up view of the corner of the previous wooden type of cabinet will reveal the large amount of cutting, fitting, assembling and finishing which went into each mahogany case. It can also be seen that the base section involved some complicated woodwork for the adjusting shafts.

Provision for Light

Door construction and support is another interesting feature of the new design. Two die cast side panels have integral channels which accommodate the counterweight mechanism for moving the doors up or down.

In the wooden models, it was believed that these end panels would need to have glass in them for sufficient light, but tests on the new balance indicate that more than enough



5. THE BASE IS BUILT of two die cast pieces attached with machine screws.

light for clear visibility is admitted from the front, rear and top glass panels. In fact, the rear panel has been made of opal glass to cut down direct glare in the operator's eyes, to provide a diffused light and to eliminate the distraction of being able to see through the rear door.

The glass panels in the two doors and in the top casting are mounted with specially molded rubber gaskets and secured with self tapping screws.

With this new type case, it has been possible for us to reduce our line to three basic styles of cases. Two of these are extremely large and, accordingly, because of the small runs, will continue to be manufactured from mahogany.

All others, however, and this includes 15 different models, will be housed in essentially this same die cast aluminum case. Various modifications will be made but the basic case will remain the same. The ability to design a housing which could be adapted to 15 different models satisfies the quantity requirements for amortizing die cast tooling costs.

Absence of magnetism is a major requirement of the material from which a balance housing is built, and this requirement is met by the choice of aluminum. The use of die casting is dictated by the accuracy of dimensions for interchangeability, the smoothness of surface for easy finishing and the virtual elimination of machining except for the minor operations already mentioned.

Housing Easily Finished

The balances are finished with a chemical-resistant type of baked enamel which is easy to keep clean, which has very satis-

factory adhesion to the metal and is handsome in appearance. Rims around the glass plates in the door are left in polished aluminum for accent.

Each balance has a built-in drawer at the bottom. The opening for this is formed in the lower casting. The front panel of the door is also produced by die casting. This was originally conceived as a stamped piece, which would certainly be less expensive, but for the stiffness and appearance which are necessary, a die casting has been selected. This part, die cast with horizontal grooves across its face, is polished for bright appearance in contrast to the enamel paint on the main housing parts.

6. DECORATIVE INTEREST is added by this die cast drawer-pull which is more rigid and more attractive than the flimsy stamping it has replaced.

Symmetrical Design Cuts Tool Cost For Improved Analytical Balance

By CARL OTTO
Industrial Designer

DEVELOPMENT of the Becker Analytical Balance was done in close collaboration with management and engineering of the Torsion Balance Company. Our initial problem was to find a contemporary technique to produce a modern case in replacement of the original mahogany cabinet work.

Throughout the preliminary sketch period, close attention was given to interchangeable rights, lefts, fronts and backs to reduce the number of tools required. These considerations quickly dictated a symmetrical design and all subsequent suggestions followed this theme.

In spite of relatively low production, die castings were chosen since they easily gave us complex forms with a reduction in the number of parts as well.

In the design of the sliding doors, die casting enabled us to wrap the doors around each side of the cabinet, giving much better access to the interior. This reduced the area of the side panels to the point where windows were no longer required in them. This not only improved the general appearance but gave a very rigid structure.

Die casting of the base provided us with all necessary mounting bosses for the column and arrest mechanism, thus replacing a myriad of small assemblies in the previous models.

Since the complete interior of the cabinet had to be finished, it is difficult to imagine the use of anything but die castings for this purpose, unless one were willing to make a complete and separate liner which would naturally have been very costly.

In styling the balance mechanism, its simplification and legibility were the cardinal points. Confused shapes and appurtenances were smoothed out to give a quiet background for reading the calibrated beams and dials. The Chainomatic dial itself was treated as a bulls-eye to reduce "hunting" on the part of the operator.

Similarly, the weight-lifting forks on the beam are located by a highly colored translucent target which moves the forks. In the interests of simplicity, Grecian architecture was removed from the column and a simple pylon shape substituted. Control knobs on the exterior of the case were grouped for convenience of operation.

The soft lines of the case have been achieved by die casting which, along with the muted grey color scheme and flat white interior, contribute to the comfort and ease of operation.

ABOUT THE DESIGNER: Carl Otto studied mechanical engineering at Michigan State College, left it in favor of auto body design with Auburn and then GMC, following which he was imported to New York by Norman Bel Geddes to work on car design.

In 1935 Mr. Otto joined Raymond Loewy and was given the job of opening and operating his London office until the war. Activities there included design of appliances and motor cars for British and Swedish clients.

With the war, he returned to New York as a partner of Raymond Loewy Associates in charge of product design. He sold his partnership in 1949 and opened his own design firm. Among his clients are Frigidaire, New Haven Clock, Hotpoint, Telechron, Thomas A. Edison, Schick, Coro Products Refining Co., Pal Blades, Dole Valve and Torsion Balance.

DURING ON LABOR PANEL

W. J. During, vice-president of the Precision Castings Co., Fayetteville, N. Y., was one of the members of a panel discussing "Labor Relations in Unorganized Plants" at the annual convention of the National Metal Trades Association in New York City recently.

AUTO-LITE PROMOTES TWO

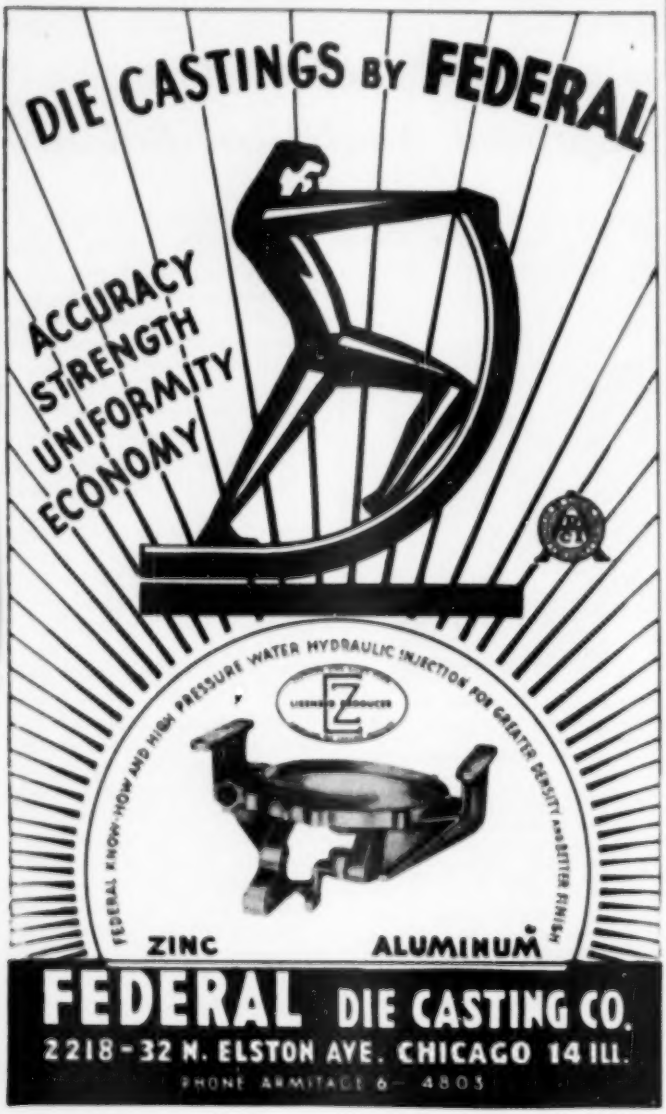
H. E. Hasemeyer has been promoted to the post of assistant production manager of the Electric Auto-Lite Company, Toledo, Ohio, it was announced recently by Royce G. Martin, president and chairman of the board of directors.

Mr. Hasemeyer, who has been manager of the Stickney Avenue plant of the company in Toledo since 1941, will assist Byron A. Fay, vice-president in charge of production.

The appointment of Irwin B. Hayes, who since 1942 has been assistant manager of the Stickney Avenue plant, as plant manager there was also announced.

M. O. WALKER JOINS MICHIGAN ABRASIVE

M. O. Walker, formerly process engineer with the Coated Products division of the Carborundum Co., has been named chief chemist of the Michigan Abrasive Co., according to Max C. Jones, president. A graduate of the University of Buffalo, Mr. Walker is a member of the American Chemical Society.



HARD-SURFACING

(Continued from Page 14)

pearance standpoint. On cast surfaces the coatings are a dull gray color; shading varies from light to dark depending on the chemical analysis of the part treated.

IS THE MHC PROCESS AVAILABLE?

The Martin Company at present has facilities for MHC to take care of its own production requirements and further development work. However, because of the interest expressed, it is attempting to complete arrangements with a licensee who will undertake to advise on the application of the coating and the installation that will be required in each case.

LIST OF DIE CASTING

(Continued from Page 24)

the only entry required will be under the heading "All Other Machines." No other entries on the card will be necessary.

Question 2:
Enter the size in square inches of the largest die casting you can make in magnesium or aluminum.

Question 3:
Enter the weight in pounds of the largest casting you can make in magnesium or aluminum.

Question 4:
Requested is your total estimated monthly production in

pieces for all of your magnesium and aluminum machines. Make the best possible estimate, assuming the average size casting that you have produced on each machine as a basis. This estimate is to cover all of your machines in each category.

Question 5:

Fill in your total estimated monthly production in pounds for all of your magnesium and aluminum machines. This estimate should be based on a single 40 hour shift less down time.

WHERE CORROSION . . .

(Continued from Page 19)

body of the wheel and its cushion tread, have maximum resistance to the effects of oil, grease, salt, alkalies, moisture and other corrosive materials.

Zinc is highly regarded throughout the food processing industry as is evidenced by the large volume of galzanized iron trucks, bins and trays which are in use. While some stainless steel is to be seen, the majority of such equipment is hot dip galvanized.

It is therefore no surprise that zinc alloy die castings have been selected for the hub caps on these truck wheels. The zinc caps are the only metal portions of the wheel which are directly exposed to corrosive atmospheres and substances.

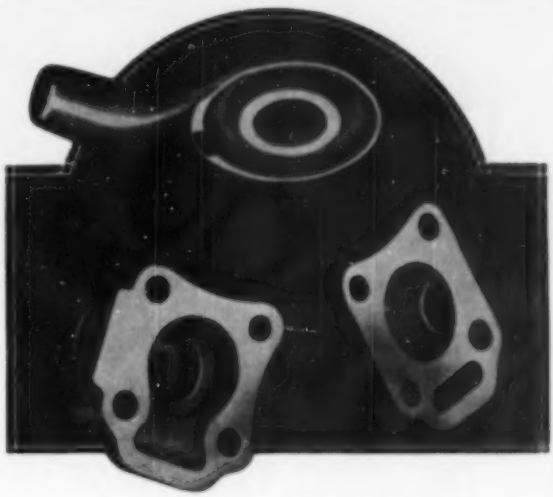
A further requirement of the hub caps is the ability to withstand impact such as occurs in daily hard usage. Two specific characteristics of zinc die castings have helped in this respect: 1) the inherent strength of the alloy which is also used for many stressed components in the automotive, appliance, business machine and industrial equipment fields, and 2) the ability to die cast a varying cross section so that adequate reinforcing ribs can be introduced.

The manufacturer has found it to be unnecessary to apply any chemical treatment for surface protection of the die cast zinc. The record of these wheels in actual use bears out this decision.

Although zinc has been used for the hub caps, aluminum is used for the die cast hubs. The reason for this lies in the method by which the wheel is attached to the hub.

As received from the die caster, the aluminum hubs are completely machined and ready to be used as inserts in molded rubber. The die cast hub, with a special bonding material applied to it, is placed in the mold where the rubber and neoprene portions are molded.

The molding process requires a temperature of 375F. for several hours with a simultaneous application of pressure. Zinc alloy used under these conditions would tend to deform with the prolonged application of temperature and pressure. The temperature is far enough below the softening point of aluminum, however, so that this material is



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DIE CASTING DIVISION
The Cleveland Hardware & Forging Co.
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not affected by the molding operation.

The die cast hub is formed with a series of small rib-like projections around its outer surface to help in anchoring the molded rubber-fibre compound. To protect the threads which are machined at both ends of the hub, a special rubber cap is placed over the threads.

Machining on these castings involves boring the hub and cutting slots for the retaining rings and oil circulation, cutting threads on the ends of the hub and inside the hub caps.

The die cast hubs and hub caps are used for several sizes of wheels, the same die castings being used for each size. Largest wheels on which the die cast construction is now being used are the 20-inch diameter wheels with load carrying capacity of 1490 pounds.

The hub caps have been designed with a projecting hex to help in tightening the hub caps onto the hub. The hex has been provided with ample depth to permit a secure grip with a wrench.

While the die cast construction is somewhat more expensive than the cast iron hubs and sheet steel hub caps previously used, it is so much more durable that subsequent savings more than compensate for the higher initial cost.

Although developed specifically to overcome certain handicaps connected with the food processing industries, this wheel has also found important uses on material handling equipment in other industries where the cushion tread and special construction are of value.

They are also being used in flour mills, grain elevators and other places where the danger of explosion requires a non-sparking truck wheel. So successful has this wheel been that the company is selling it as an independent unit, as well as incorporating it into the company's own line of hand trucks.

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GADGETS

(Continued from Page 21)

from a variety of materials, but a large number are small die castings. The die casting process lends itself quite well to the manufacture of gadgets, the practicability of mass producing very small die castings already having been demonstrated.

The horseshoe gadget mentioned previously, which went out on over a million letters sent by a charitable organization, has the words "Good Luck" on one side, and on the reverse side has raised interrupted flanges like those of its full-size counterpart. Detail on a casting of this size is easily obtained by engraving the die.

Finishing the gadget presents little difficulty. The flash, being extremely thin, is easily removed and the part is polished prior to coating. The gadget can then be plated, or if desired, a low-cost dipping or tumbling operation can be used to apply a clear or colored coat.

FINISHING DIE CASTINGS

A SECTION DEVOTED TO THE FINISHING PROCESSES

MACHINING—Most die castings require some machining operations. In this section will be found information to aid in planning and selecting the proper method and equipment for these operations.

ASSEMBLING—Die castings are generally assembled components. This section includes information on fastenings and methods for mass production assembly operations.

SURFACE FINISHING—Most die castings receive some type of surface finish such as plating, organic coating, anodic coating or chemical coating. This section contains information on the methods, processes and equipment used for the various surface finishing treatments on the die casting alloys.

News about UNICHROME Trade Mark COATINGS for METALS

What! HIGH SPEED chromium plating?

The most important advance in chromium plating in 20 years, Unichrome S.R.H.S. Chromium plates faster than conventional solutions – in some cases cutting time in half. It also plates bright over a wider current range – assuring less "burning" and "missing" on irregular parts. Its self-regulation insures good throwing power and provides a more foolproof bath with less supervision.

Enduring rock protection in all cycles

A green plastisol baking coating, Unichrome Coating 218X withstands severest plating cycles, including vapor degreasing. It does not contaminate plating baths. Uses a *single* prime coat. Technical help on application technique provided to assure longest-lasting job.

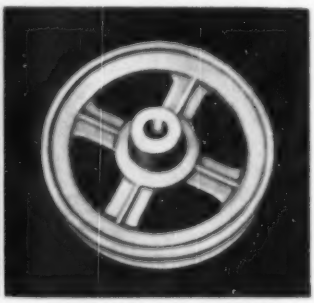
Less buffing for copper plate

Without using brighteners, Unichrome Pyrophosphate Copper deposits a s-m-o-o-t-h plate. If needed at all, buffing of this ductile copper takes less time and effort.

How to get a QUALITY finish at an ECONOMY price

Extra bright, durable finish on zinc plate ...
Extra corrosion-resistance for zinc die castings ...
provided at a low, low cost by **UNICHROME DIP PROCESS**

Zinc die castings that require a bright, sparkling finish can get it with zinc plate and the Unichrome Dip process.



Chromate treated in Unichrome Dip, zinc die cast parts resist corrosion with a yellowish to olive drab finish.

Zinc plate followed by the Unichrome Dip process works wonders on sales appeal and finishing costs. The ordinary zinc gains chromium-like brightness. Some users have reported it the brightest dip finish they've *ever* seen. And it stays bright. For Unichrome Dip Finish adds corrosion-resistance – protects the zinc against dulling.

Yet this kind of finish costs you only a fraction of a penny per square foot of average zinc surface treated. Therefore, you can see why Unichrome Dip Finish is being used extensively on zinc die castings, refrigerator shelves, wire goods, screws, nuts, bolts and other parts.

The Unichrome Dip process is a chemical treatment. The finish it forms is integral with the zinc surface. It can also be used to chromate-treat unplated zinc die castings. Such chromate treating produces a yellow or olive drab coating with corrosion-resistance even greater than that obtained with the bright finish—again at rock-bottom cost.

We'll gladly send you more information on Unichrome Dips. And remember, if you have a problem in metal finishing, chances are you can find a solution at "Coatings for Metals" headquarters.

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PRODUCTION CLINIC
for finishing die castings

A monthly digest of current technical progress selected and prepared by the editorial staff of DIE CASTINGS. This section is devoted to finishing processes for all types of die castings, and is written specifically for the benefit of the production man.

PRECIOUS METAL PLATED FINISHES FOR DIE CASTINGS

GOLD AND SILVER applied as a final plated finish to a properly applied undercoat, generally the copper-nickel sequence, have been used to enhance the appearance of a variety of die cast products.

Gold plating is used extensively in the jewelry and trophy field, principally for providing an attractive or unusual decorative finish with tarnish resistance. Gold plating of pen points, jewelry, musical instruments, and silver plated hollow ware has been practiced for many years to add beauty, tarnish resistance, and value to these products.

Silver coatings are also applied to a variety of metal products, particularly to many decorative metal articles of the home. Rhodium plate can be used to give high reflectivity and to aid in tarnish resistance.

The "Golden Hour" electric clock shown in Figure 1, which is manufactured by the Jefferson Electric Company, illustrates the use of gold plating to achieve a rich looking final finish. The dial ring and base of the clock shown in Figure 2 are die cast zinc.

The clean cut cast numerals on the ring are painted to provide maximum visibility and the smooth surfaces on the castings are given a final plated finish in 24-karat gold.

Figure 3 shows the use of a combination of gold plating, silver plating, and organic finish on zinc die castings to produce the Carling's Red Cap Ale plaque which has unusual eye appeal.

In this case, the letters, the jockey cap, and the oval plate with the beaded edge are individually zinc die cast as shown in Figure 4. The cap is finished in a brilliant red baked enamel. The letters are hand inlaid in a combination of lacquer and gold plate. Each of these castings has integral studs on the back which fit into holes subsequently drilled in the silver plated oval die casting. Speed nuts are used to anchor the studs in place.

According to the recommendations of the New Jersey Zinc Company, nickel, or the copper-nickel sequence is most commonly used as an undercoat for gold and silver plating on zinc base die castings. Gold and silver plated coatings can also be applied to aluminum and magnesium die castings that have been given the proper pretreatment and undercoat.

In the case of magnesium, the Dow Chemical Company has reported[1] that

Figure 1. The new "Golden Hour" electric clock utilizes gold plating to achieve a rich looking final finish on zinc die cast parts.

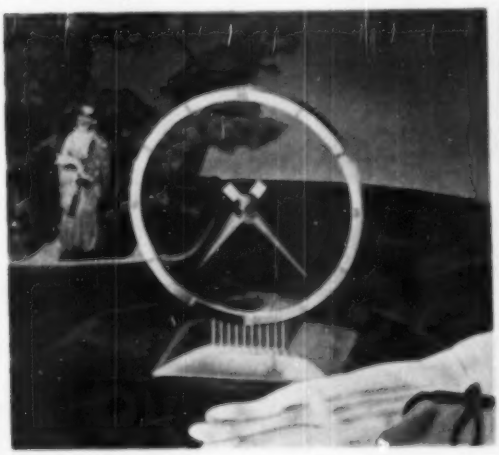
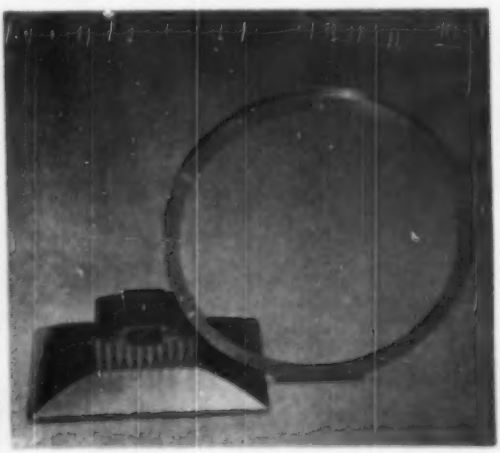


Figure 2. Detail of design of zinc die castings used in the "Golden Hour" electric clock which are finished in a 24 Karat gold plate.



although silver may be applied from conventional cyanide baths after the initial copper strike, it is preferable to plate heavier copper, and apply a nickel strike, before silver plating to obtain the best adhesion between the copper and silver.

Gold Plating Baths

One of the principal uses of gold plating is in flashing or "coloring" applications. In many cases the gold plate is protected by a covering of transparent lacquer, which is baked on where the utmost in wear is required. It has been pointed out[2] that costume jewelry made of brass or white metal plated first with about 0.0002 of bright nickel, then with only enough gold to give the desired color, and finally covered with a good grade of baked transparent lacquer has been found to stand up so well that failures in service are practically negligible.

Where the desired color cannot be obtained with 24 karat gold, alloy deposits are used. These alloys are seldom under 22 or 23 karat (92 to 96 per cent gold) yet they are often spoken of as "14 karat," "16 karat," and so on. Thus, a plater will speak of a "14 karat gold plate" when he means that the color of the gold deposit is that of a massive 14 karat gold.

As a general rule, if a large volume of gold plating solution is to be used, the optimum gold concentration is the minimum that will produce satisfactory deposits. The investment cost is thus limited, and the dragout losses reduced. Typical compositions of gold cyanide plating baths[2] are given in Table I.

These baths consist of gold (aurous) cyanide dissolved in excess alkali cyanide, with or without additions of alkali phosphate and carbonate. The phosphate bath is reported to produce deposits of lower karat shades. In some production operations, an old, partly exhausted bath is sometimes used for applying the first or so-called "shading" coating. This may or may

TABLE I

Typical Gold Cyanide Plating Bath Compositions

CONSTITUENT	CONCENTRATION			
	BATH NO. I		BATH NO. II	
	g./L.	oz./gal.	g./L.	oz./gal.
Metallic gold* (as fulminate or cyanide)	2.1	0.25	4.2	0.5
Cyanide (KCN)**	15.0	2.0	15.0	2.0
Phosphate ($Na_2HPO_4.12H_2O$)	4.0	0.5	—	—
Carbonate (Na_2CO_3 or K_2CO_3)	Variable		Variable	

*Recorded in the formulas as troy ounces per gallon. Theoretically, AuCN equals 88% gold; $NaAu(CN)_2$ equals 72.5% gold; $KAu(CN)_2$ equals 68% gold.

**If NaCN is used in place of KCN, the bath concentrations are 11.3 g./L. or 1.5 oz./gal.

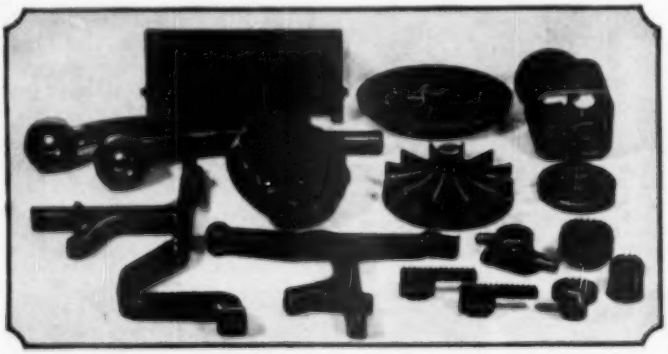


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TABLE 2

	g./L.	oz./gal.
Metallic gold (as cyanide)	8.4	1.0 (troy)
Potassium cyanide (KCN)	11.0	1.4
Free cyanide (KCN)	8.0	1.0

not be brushed before applying the final coating in a fresh bath with higher metal content. This step is generally called "coloring."

Metal and complex ions in the cyanide gold plating baths are supplied by the alkali gold cyanide[5], $KAu(CN)_2$. When operating with soluble anodes, the free alkali cyanide maintains the metal content of the bath. Carbonates and phosphates serve as buffers[6] and increase the conductivity of the bath.

The metal content of these cyanide baths, in practice, is reported to vary from 1 to 5 g./L. (0.12 to 0.6 troy oz./gal.). The free cyanide may vary from 2.25 to 11.3 g./L. (0.3 to 1.5 oz./gal.). Both the metal and free cyanide concentrations are controlled by regular analyses of the solutions. Carbonate is sometimes omitted from new baths since it builds up during operation. However, preferred practice is to add a small amount, up to 15 g./L., of carbonate or phosphate ($Na_2HPO_4.12H_2O$), since without these buffers, the pH may vary widely.

Caustic soda additions has been suggested for producing a light rose gold plate and carbonate for a dark rose gold[5].

Operating characteristic for these gold cyanide plating baths are reported[5] to be as follows: Cathode current density range—1 to 5 amp./sq. ft.; temperature 40 to 60C. (104 to 176F.); Voltage—2 to 5 volts. Higher temperatures and higher metal concentration permit the use of higher current densities.

It is reported that the current efficiency may approach 100 per cent under favorable conditions of low current density, high temperature, and relatively high metal concentration with moderate free cyanide. It is common practice to vary the operating conditions to obtain the shade of deposit desired. Conditions may result where the anode efficiency may be higher than the cathode efficiency.

A formula that has been recommended for gold plating where heavier deposits are needed has the composition[6] shown in Table 2.

This bath is usually used at an elevated temperature; it is reported that current densities of 10 amp./sq. ft. can be used, with a cathode efficiency close to 100 per cent.

A bath composition that has been suggested for plating yellow gold has the composition[7] shown in Table 3.

A temperature of 75 to 150F. is recommended, with a cathode current density of 2 to 5 amp./sq. ft. Higher operating temperatures makes the color of the deposit more yellowish. 24 karat gold anodes are used. Potassium gold cyanide may be substituded for sodium gold cyanide. When potassium cyanide is substituted for sodium cyanid, ⅓ more should be used.

It is not always easy to regulate the rate at which gold anodes dissolve so as to maintain the metal content of the solution at the desired concentration. Under many conditions gold tends to dissolve with a higher anode than cathode efficiency, resulting in an increase in the gold content of the bath.

To avoid this condition, part of the gold anodes may be replaced with steel or carbon anodes. One authority has recommended stainless steel anodes to reduce the gold content of the bath. In a number of cases, gold plating baths are operated with insoluble anodes. This requires that gold be added to the solution from time to time in the form of salts.

A convenient method that has been suggested[8] for maintaining a

(Continued on Page 66)

Figure 3. The Carling's Red Cap Ale plaque utilizes both gold and silver plating on zinc die castings to add richness and dignity to its design.

Figure 4. Individual parts of the Carling's plaque; the letters, the jockey cap, and the oval plate with the beaded edge are individually zinc die cast. The cap is finished in brilliant baked red enamel. The letters are hand inlaid in a combination of lacquer and gold plating. The oval die casting is silver plated.

1. THE LOADING AND UNLOADING shown above are the only manual operations connected with the spray phosphating of Sunbeam electric appliance components. Zinc and aluminum die castings and steel stampings all go through together for the entire pre-paint cycle. Temperatures of solutions are all controlled automatically, as is spray pressure.

Conveyorized Pre-Paint Setup Doubles Phosphating Production

2. TWICE AS FAST as the previous manual dipping method shown below, the new automatic conveyorized system has eliminated a finishing bottleneck. Although satisfactory finishes are obtained by manual operation, production volume is not high enough for the requirements of electric appliance manufacturing.

FINDING hand-operated dip tanks too slow for Bonderizing the high volume of metal parts going into their electric household appliances and lawn sprinklers, Sunbeam Corporation of Chicago has changed over to an automatic conveyorized spray-Bonderizing system to reach the required output.

Zinc and aluminum die castings and steel stampings are all processed through a single cycle to produce an inert phosphate coating on the metal for corrosion resistance and the formation of a non-conducting bond between the base metal and the paint coating.

This compact phosphating system, occupying an area only 44 feet long and 13 feet wide, was designed and built by the Sunbeam Stewart Industrial Furnace Division of Sunbeam Corporation. *The result of installing this unit has been a 100 percent increase in volume of output. It is capable of processing about 1,200 square feet of surface area on metal parts per hour.*

The entire cycle is automatic from the time the racks are loaded with parts, until they emerge 20 minutes later ready to be painted. Material may be loaded onto racks or into mesh baskets suspended from the overhead conveyor chain. The conveyor travels at a rate of five feet per minute.

The completely enclosed unit consists of five spray zones separated by drain spaces. Spray nozzles in each zone are arranged to provide a uniform spray pattern that completely envelopes the parts being treated.

In the first two zones which accomplish the cleaning and hot water rinsing, flat spray type nozzles are used and the solution is sprayed at high pressure to add the mechanical action of the impinging solution to the chemical cleaning action.

In the other three zones, a hollow cone type of nozzle is employed and the solution is delivered at low pressure to create a wetting and soaking action.

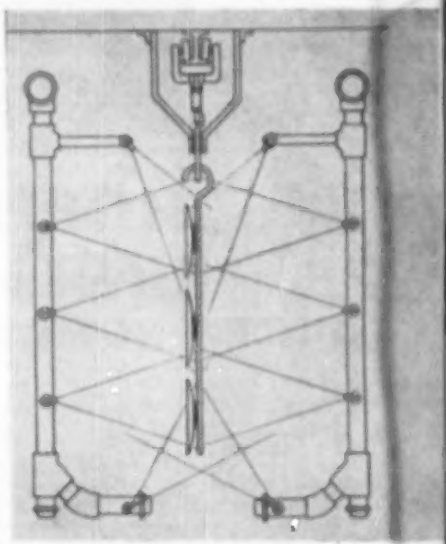
Under each spray zone is located a reservoir tank for the spray solution. From these tanks the heated and filtered solution is lifted by centrifugal pumps and delivered to the spray guns at the desired pressure.

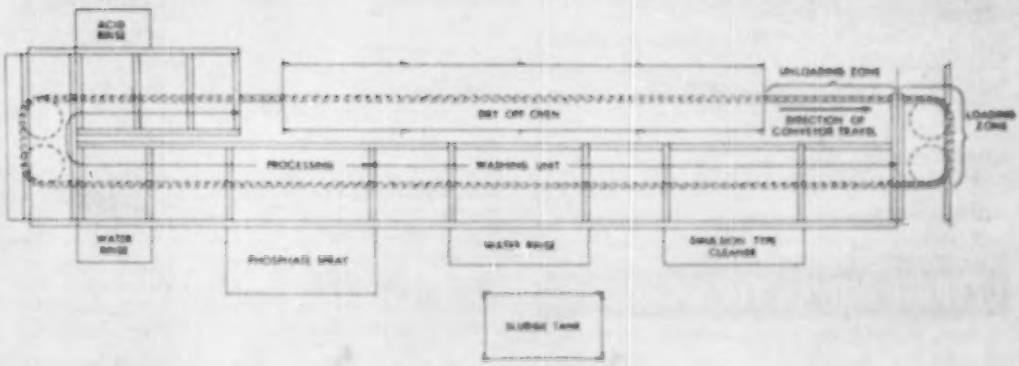
Inspection doors at intervals along the conveyor housing permit examination of the spray patterns, repair and maintenance work, etc. Overhead lights shine down through leakproof glass sections to illuminate the interior and aid in in-

Some Facts and Figures On Mechanized Spraying:

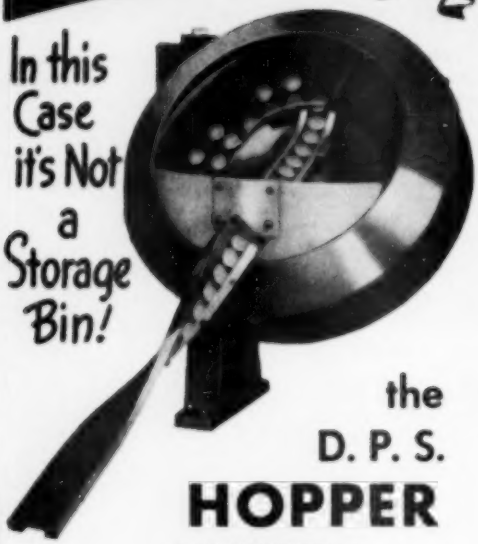
3. FULL COVERAGE OF PARTS by the spray is accomplished by careful location and direction of each nozzle, as shown at the right. Flat spray nozzles with high pressure are used in the first two spray zones and hollow cone nozzles with low pressure are used in the other three spray zones.

4. FIVE SPRAY ZONES and a convection heated dry-off zone are compactly arranged in a space 44 feet in length and 13 feet in width. This equipment can process about 1,200 square feet of surface area on metal parts per hour. The conveyor travels at a rate of five fpm, with the entire cycle taking 20 minutes. Storages tanks under each spray zone hold the solution which is heated by steam coils and then delivered again to the spray nozzle by centrifugal pumps. Variations of this setup with different arrangements of spray zones as desired, should be useful for applying many types of solutions and coatings.





What is a HOPPER?



In this Case it's Not a Storage Bin!

the D. P. S.

HOPPER UNIT is a SELECTIVE FEEDING DEVICE

WHEREBY PRODUCTION PARTS ARE SELECTED, ORIENTED AND FED IN A GIVEN POSITION FOR PRIMARY AND SECONDARY OPERATIONS

It represents the result of our years of experience in solving feeding and assembling problems with the view of speeding production and reducing costs . . . and D.P.S. Hopper Units have proven just that in thousands of plants through the elimination of the manual handling of parts. They are widely adaptable to Presses, Centerless Grinders, Thread Rolling and Slotting Machines and special machines. They do a precision job of feeding screws, screw blanks, rivets, pins, nuts, discs, washers, steel balls, etc. Sizes 8", 10", 12", 16", 24" and 30" diameters. Let D.P.S. Hoppers prove their indispensability in your plant. Send special parts for hopper feeding information and adaptability to your special machine.

Mail Coupon for Catalog

DETROIT POWER SCREWDRIVER CO.
3021 WEST FORT ST., DETROIT 16, MICHIGAN

Yes, send along your new catalog . . . sounds interesting.

COMPANY NAME_____

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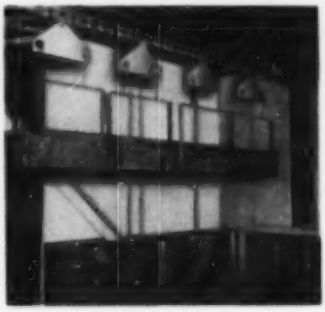
CITY_____ STATE_____

DETROIT POWER SCREWDRIVER CO.

3021 W. FORT ST. DETROIT 16, MICH.

spection. Position of the lamps simplifies the replacement of burned out bulbs.

The various solutions and rinses used in the system are heated by steam coils to specific temperatures and are continuously collected and recirculated. Periodic solution analysis assures a



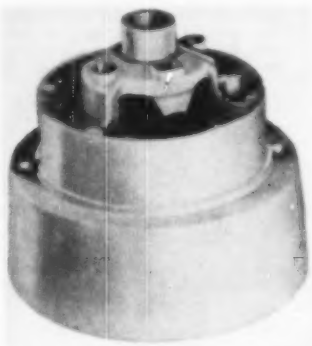
5. For parts too small to rack efficiently, these baskets are used.

more uniform coating. Steam coils in the baths are arranged vertically to allow sludge to settle to the bottom of the tank.

The preliminary steps before Bonderizing consist of thorough cleaning and rinsing. An emulsion type cleaner containing a small amount of alkali is sprayed at 160F to remove grease and oil. Next comes a hot water rinse at 140F.

The usual delay between degreasing and Bonderizing when the process is carried through manually, is eliminated by the conveyorized setup. The parts are transported through the phosphate zone while deluge sprays hit every part of the work with solution at 145F. The racks or baskets then move to an unheated water rinse.

Final spray zone consists of a Parcolene or chromic and phosphoric acid rinse at 150F, after



6. A typical die cast part which goes through the spray line is this electric mixer component.

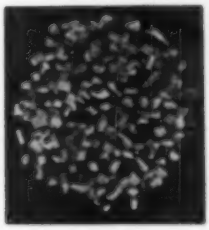
which the conveyor moves on through a gas-fired convection type drying oven.

A high temperature recirculating fan moves the heated air into the dry-off chamber. The heated air enters near the discharge end of the chamber and moves counter to the direction of travel of the conveyor. After passing over the work, the air returns to the combustion chamber where it is reheated and recirculated.

NEW PRODUCTS

For additional information on the products appearing on this and the following pages, mark the key number of the item on the card bound into this issue. Drop the card in the mail—no postage is required.

BARREL POLISHING COMPOUND MADE OF SAWDUST, CORN COBS



Kube-Kut, Inc., Garfield, N. J., announces a new barrel polishing medium, Korn-Kube, for all metals, plastics, rubber, wood, glass and other materials. The compound is composed of hardwood in cube form and macerated corn cobs. Both materials are screened and aspirated to remove dust, and the mixture combines the high absorption of the sawdust with the polishing action of the pulverized corn cobs.

The mixture is of use in the drying and polishing of metals and other materials which can be processed in tumbling barrels. A variety of mixtures and particle sizes are available to meet specific conditions and requirements.

For additional information circle No. 1 on the Reader Service card.

HAND-OPERATED 800-POUND ARBOR PRESS

A new, hand-operated arbor press for light high-speed production and assembly work is now being offered by H. D. Herder Tool Specialties of Kalamazoo, Michigan. The HP-600, as it is called, has three slots for arbor work and will handle work up to a diameter of 4⅞ inches.

Frame, table and table standard of the HP-600 are iron castings. The base of the frame has a one inch arbor opening and is finished to serve as an auxiliary table. The ½ inch square ram has a travel of 2⅝ inches, and ram take-up is provided. The press gives an approximate pressure of 800 pounds with a leverage ratio of 16:1.

For additional information circle No. 2 on the Reader Service card.

CHROME PLATING BARREL FOR SMALL PARTS

A 24-inch, batch-type chromium plating barrel designed for hard and decorative plating of small parts has been introduced by United Chromium, Inc.

According to the firm, the barrel offers low-cost plating of parts difficult to handle on racks or in baskets with production as high as 100,000 to 500,000 pieces per 8-hour day claimed for one manufacturer.

A 24-inch diameter by 20-inch long cylinder mounted in a 150-gallon tank with bearings, connections and brush contacts outside the barrel feature the construction. Both tank and cylinder are fabricated of insulated steel. Included with the barrel are an electric stirrer, a temperature control coil, an exhaust hood, a drip pan and an unloading device.

The barrel uses a special Unichrome self-regulating high speed chrome plating solution which is maintained simply by the addition of water and Unichrome S.R.H.S. salts. Additions are made on the basis of solution density as determined by a hydrometer, rather than on the chemical analysis of the solution.

For additional information circle No. 3 on the Reader Service card.

TWO LIQUID POLISHING COMPOUNDS

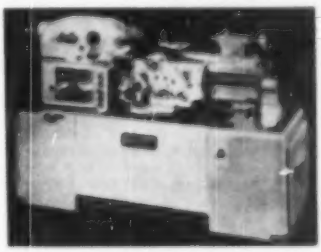
The Lea Mfg. Co., Waterbury, Conn., has introduced two new liquid polishing and buffing compounds to its line of platers' supplies. The first, a greaseless, non-flammable, quick-drying abrasive for burring and polishing is called Leabramont. Obtainable in grit sizes from 100 to fine micron, it can be sprayed or brushed on polishing or buffing wheels and is suitable for hand or automatic machines and for renewing worn abrasive belts.

The second is called Leamont and is a polishing cement featured by flexibility and long life. It can be sprayed or brushed on the wheel prior to loading up with loose abrasives. Both products are available in 5, 30 or 50-gallon units.

For additional information circle No. 4 on the Reader Service card.

TOOL ROOM LATHE FEATURES RUGGED CONSTRUCTION

A new precision tool room lathe designed to provide increased power and ruggedness is now being offered by Rivett Lathe & Grinder, Inc., Boston, Massachusetts. Recommended for both semi-



true instrument work and heavy carbide cutting, the new Model 1020S is designed to handle any tool room turning within its 12½ inch swing and 20 inch centers.

Features designed to increase the machine's versatility are a weight of 4,000 pounds, a headstock back-gearing at speeds ranging from 22 to 400 RPM, a three-bearing spindle mounting, a spindle giving an infinite range of speeds to 3,600 RPM, collets mounted directly in the spindle without an adaptor and a gear box providing 72 feeds and 84 threads.

For additional information circle No. 5 on the Reader Service card.

STAINLESS STEEL PUMP WITH LUCITE FILTER USEFUL FOR PLATING SOLUTIONS

A new model filter pump with a capacity of 100 gallons per hour has been brought out by Sethco, Jamaica, N. Y. Called the

It's New! Completely Modern!
THE Murco
32"X48" - 5 HP
TUMBLING BARREL
MURCO
VARIABLE SPEED
SPEED CHANGES WHILE BARREL IS IN MOTION
STOP BARREL ANY POSITION
COMPACT
SAVES TIME
Here's a tumbling barrel that incorporates all of the features demanded by up-to-date tumbling barrel operators.
Check the features of design and construction that contribute to the high efficiency of the new MURCO Tumbling Barrel . . . you will see why MURCO Tumbling Barrels are preferred by those plants that deburr, burnish, clean, polish and smooth-surface metal and plastic parts on a mass-production basis. Compact, the new MURCO Tumbling Barrel occupies less floor space.
Motor and operating mechanism are totally enclosed . . . the only exposed parts are the hand wheel controls, and the magnetic reversing starter. With variable speeds from 10 RPM slow speed to 25 RPM high speed you have an infinite range of speeds in between, to meet various operating requirements . . . speed changes may be made while barrel is in motion, no cumbersome changes of belts or pulleys.
The hydraulic brake stops the barrel in any position . . . and is easily accessible at floor level. Facilitates loading and unloading, and prevents accidental dumping of loads. Completely safe in operation. A limit switch permits operation only when hood is closed.
SAMPLE PARTS PROCESSED
At no charge or obligation we will process sample parts for you . . . write today for complete details.
D. J. MURRAY MANUFACTURING CO.
MANUFACTURERS SINCE 1883
WAUSAU WISCONSIN

LSI-10, the device features a stainless steel pump and a high temperature lucite filter cylinder.

Some of the advantages claimed for the filter pump are complete resistance to all electroplating solutions, safe operation at temperatures up to 200°F, complete recoverability of the solution, an easily cleaned filter tube and a dense winding on the filter tube which is said to remove very fine particles satisfactorily.

For additional information circle No. 6 on the Reader Service card.

FLUE HEAT USED TO PRE-HEAT METAL IN ALUMINUM MELTING FURNACE

The type "MC" furnace, manufactured by the Stromag Furnace & Engineering Co., Franklin Park, Illinois, is an open flame reverberatory furnace designed particularly for melting aluminum.

The heated combustion products travel through the furnace and out through a flue which also acts as a charging hopper. The metal charge is pre-heated in the hopper and melts in the throat

of the hopper, and then goes down into the molten bath. For this reason, cold metal never reaches the molten bath, and metal at the correct pouring temperature is always available.

The roof of the furnace is made in removable sections, so that with the removal of the section, the entire bottom and side walls of the furnace are readily accessible for lining maintenance and repair. A nine-inch lining of standard-shaped brick is provided on the bottom, side walls and roof.

Dipout wells fed from the molten bath inside the furnace are located on either or both sides of the "MC." A large opening directly below the burner provides a means of drossing or fluxing the molten bath, or can be used to realloy the aluminum, since most of the alloys used must be puddled into the aluminum. The furnace is also equipped with a drain tapping the furnace in the event that it should prove desirable to run the metal into bowl ladles or to holding furnaces.

A type "SW" furnace of the same general design is available in a tilting model for use in die casting operations where a separate breakdown unit is required for the running back of returns and ingot.

For additional information circle No. 7 on the Reader Service card.

READER SERVICE

For your convenience, all literature, samples and services offered by advertisers in this issue are listed beginning on page 4. Any of these items may be obtained by circling the proper number on the Reader Service Card.

NON-FLAMMABLE HYDRAULIC FLUID FOR DIE CASTING SAFETY

A non-flammable hydraulic fluid called Lindol which is reported to be non-oxidizing, non-corrosive, non-volatile, odorless and non-toxic is manufactured by Celanese Corporation of America.

Elimination of the fire danger of fire hazard is claimed for this material which has been used in die casting machines of major producers for the past six years.

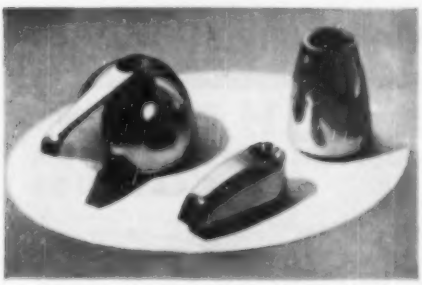
Lindol is a stable, oily chemical compound having desirable

PREVENT Blistering, Streaking
on zinc-base die-castings

with DIVERSEY No. 505

Sensational NEW
ELECTRO-CLEANER AND SURFACE CONDITIONER!

Actual photograph of blistering on zinc die casting cleaned with conventional cleaner.



Actual photograph of finished zinc die castings cleaned in new Diversey No. 505.

Designed especially for reverse current electro-cleaning of zinc-base diecastings, *new* Diversey No. 505 completely, *safely* removes all unwanted deposits! In addition, Diversey No. 505 helps condition the surface of the zinc, providing better adhesion between the electro plate and the base metal!

This unique, double-action of Diversey No. 505 helps provide a uniformly clear, brilliantly lustrous finished surface . . . one free from blistering, peeling and streaking! Diversey No. 505 is economical, easy to use and available now! Investigate Diversey No. 505!

For complete information on Diversey No. 505

THE DIVERSEY CORPORATION
Metal Industry Department
1820 ROSCOE ST., CHICAGO 13, ILL.

THE DIVERSEY CORPORATION
METAL INDUSTRY DEPARTMENT
1820 Roscoe St., Chicago 13, Ill.

Gentlemen:

Please send me complete information on *new* Diversey No. 505.

Name_____

Title_____

Company_____

Address_____

City_____ State_____

lubricant qualities. Tests have indicated a film test of approximately six times that of a lubricating oil having the same viscosity characteristics.

Increased protection both to equipment and personnel is said to more than offset a slight additional cost over the traditionally used mineral oils. Lindol HF is available in containers from one gallon cans to tank car units.

For additional information circle No. 8 on the Reader Service card.

INDEXER SPEEDS POSITIONING OPERATIONS

The Erickson 3-Position Indexer is a positive-locking indexer which is said to speed up and simplify those locking and positioning operations that require three divisions (120 degrees).

The indexer, it is claimed, can be adapted to any job requiring three-position locating, eliminating the need for many work-holding devices for milling, drilling, tapping, punching and other similar machine operations.

When connected to table controls for fully automatic operation, the Erickson Indexer follows a complete cycle of operations without attention from the operator. The company claims that this results in increased production and lower labor costs, because adjustments and set-ups between operations are eliminated.

For additional information circle No. 9 on the Reader Service card.

ADHESIVE FOR BONDING DIS-SIMILAR MATERIALS

Resimont, manufactured by Paisley Products, Inc., Chicago, Illinois, as a paper to metal labeling adhesive, is reported to be an extremely useful adhesive for a variety of bonding operations, according to the company. It is suitable for many combining and laminating operations on similar and dis-similar materials.

Resimont is dilutable with water and can be applied by hand brushing, gumming machines or spray guns to adhere porous materials to many different non-porous surfaces. It is claimed to be fast setting, holding porous materials and labels immediately on contact, with a permanent bond that will not shrink, crystallize or allow assemblies to delaminate.

For additional information circle No. 10 on the Reader Service card.

HIGH POWER AND SPEED DEVELOPED BY DOUBLE-ACTING CYLINDER

A new double-acting air cylinder is now being marketed by the Bellows Co., Akron, Ohio. Called the Super Speed Air Motor, the cylinder develops a very high piston rod speed and power from normal operating pressure, according to the company.

Utilizing a built-in air accumulator and a quick release valve, it is said to build an explosive air force many times more powerful than that obtained from standard air motors of the same bore and air pressure.

With a piston rod speed six to ten times that of a standard air cylinder, Model BSSM-5 with 100 pounds of air pressure will develop a force sufficient to punch a 1/2 inch hole in a 1/16 inch mild steel plate.

For additional information circle No. 11 on the Reader Service card.

PROCESS PREPARES ALUMINUM FOR PAINT FINISHES

A patented process which has been in use by the Pyrene Manufacturing Company in both Great Britain and America for a number

(Continued on Page 72)

This FREE Folder Tells How To Do It

Can you clean steel and condition it for painting for less than 20 cents per 1,000 square feet?

WITH minimum equipment . . . in minimum time . . . at minimum cost . . . the OAKITE CrysCoat PROCESS* cleans metal surfaces and prepares them for painting . . . prevents corrosion before and after the metal is painted.

*Reg. U. S. Pat. Off.

FREE Write to Oakite Products, Inc., 34G Thames St., New York 6, N. Y., for Folder F7642. This 8-page illustrated leaflet describes 19 advantages of the OAKITE CrysCoat PROCESS and lists 10 ways in which it cuts the cost of cleaning and preparing for painting.

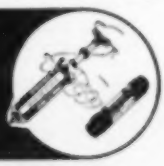
ALSO *ask about Oakite procedures for:*

Machine cleaning	Tank cleaning	Electrocleaning
Steam-gun cleaning	Pickling	Paint stripping
Barrel cleaning	Burnishing	Rust prevention

Technical Service Representatives in Principal Cities of U. S. & Canada

OAKITE SPECIALIZED INDUSTRIAL CLEANING MATERIALS · METHODS · SERVICE

HYPREZ DIAMOND COMPOUNDS



SAVE HOURS OF BUFFING TIME ON YOUR DIE CASTINGS

Hyprez Diamond Compounds finish your die fast — for smooth, precisely accurate die castings of perfect contour — often eliminating all buffing time.

Twenty-six engineered standards provide the exact grades for every job — from rough finish to mirror polish. Available in 18 and 5 gram color-identified cartridges, for use with the Hyprez Applicator Gun.

Only HYPREZ Can Do a HYPREZ Job!

Ask For Free **HYPREZ Laminated Lapping Stick**

Available in square, round or rectangular six-inch lengths. Any size may be pointed or shaped for fine detail.

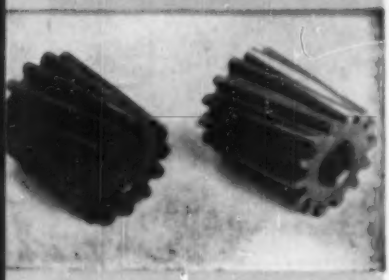
For free demonstration, or for Hyprez Laminated Lapping Stick, write to Dept. D-1150.

HYPREZ DIVISION
ENGIS EQUIPMENT CO.
431 South Dearborn St. Chicago 5, Ill.

SLASH FINISHING COSTS UP TO 95%

WITH AMERICA'S MOST VERSATILE PRECISION BARREL FINISHING PROCESS

The Difference Is Supersheen



The Difference Is Supersheen

The Above Photos Are Unretouched

Supersheen*

- Some manufacturers report their ALMCO SUPERSHEEN equipment paid for itself in ONLY ONE OR TWO MONTHS!
- We know of no installation that hasn't paid for itself in less than a year!
- A single unit installation will replace from TWO TO TWELVE MEN.
- ALMCO SUPERSHEEN equipment is used by the nation's leading manufacturers.
- ALMCO SUPERSHEEN equipment is enabling manufacturers in many fields to reduce costs to an extent they never thought possible.
- AND, the ALMCO SUPERSHEEN process consistently produces . . .

*A Better Finish—FASTER

"COMPLETE" IS THE WORD FOR OUR SERVICE AND EQUIPMENT

● The Most Complete Line On the Market

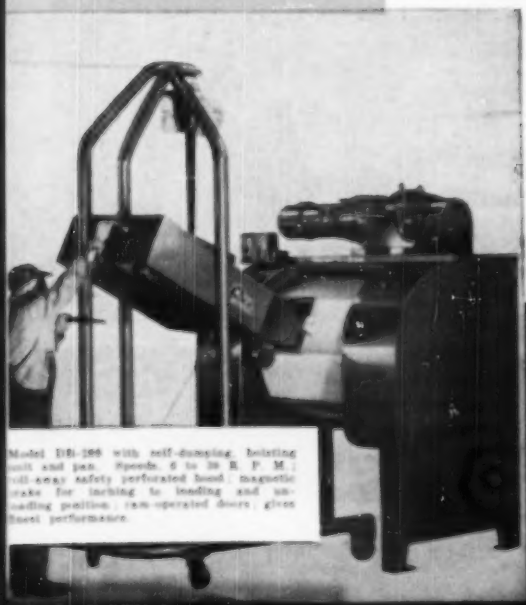
(1) Advanced Design PRECISION Tumbling barrels in sizes from 8"x16" up to 60"x30" (2) AUTOMATIC loading, unloading and separating equipment (3) A vastly SUPERIOR grinding and finishing medium in 7 grades and 9 sizes.

● FREE ENGINEERING CLINICS

Nationwide Network of Engineering Clinics provide you with QUICKER and BETTER sample processing—Keep you fully informed of latest methods. Write today for full details—or send unfinished samples for FREE Engineered Pilot Run and complete production cost data. Include finished part for guide.

ALMCO DIVISION

Queen Stove Works, Inc. — Albert Lea, Minn.



Model DBI-200 with self-dumping, hoisting unit and pan. Speeds, 6 to 30 R. P. M.; roll-away safety perforated hood; magnetic brake for locking in loading and unloading position; ram-operated doors; given finest performance.

FREE SAMPLE PROCESSING ■ GET FACTS TODAY

Dept. D-11 Please send me latest descriptive literature and address of nearest SUPERSHEEN Engineering Clinic.

NAME _____

ADDRESS _____

_____

MERGENTHALER LINOTYPE PROVES IT!

CASE HISTORY NO. 219

(Letter received from the Mergenthaler Linotype Company, March 31, 1950.)

The Roto Finish Company
Kalamazoo, Michigan

Attn: Mr. D. T. Barrett, Pres.

Gentlemen:

We have been using the Roto Finish Process on various Steel, Brass and Cast Iron parts for a period of two and one-half years. We are glad to report we have effected saving to justify purchasing a three machine installation with magnetic separator.

Roto Finish Process has considerably reduced our hand deburring and polishing and has given us a more uniform quality.

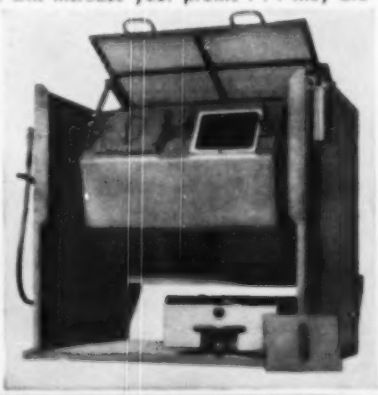
Sincerely,
MERGENTHALER LINOTYPE COMPANY
(Signed) G. W. Allison
Vice President & General Works Manager

The Mergenthaler Linotype Company, of Brooklyn, N.Y., is just one of many industries in diversified fields who have proven to their satisfaction that Roto-Finish Processes do a better finishing job faster, at less cost, than other methods.

Roto-Finish Processes will reduce your finishing costs with savings as high as 80%, increase your production, and give you greater uniformity. This is proven by countless users of Roto-Finish Processes. Cost studies show actual cost reductions from 25% to 80%. Roto-Finish Processes will increase your profits . . . they are "the rolling stones that gather dollars."

The original Roto-Finish System of controlled rotary action grinds, descales, deburrs, polishes, britehones and colors metals and plastics faster, with greater uniformity, at less cost, than other methods. Initial installation costs are moderate. Roto-Finish requires no expensive exhaust equipment.

Write today for the full story of "the rolling stones that gather dollars."



MAKE US PROVE IT!
SEND US YOUR SAMPLES

OR, better still, bring your samples personally to the Roto-Finish Plant. See Roto-Finish Sample Processing Department finish your parts . . . prepare a report, furnish cycle time, estimate cost of labor and materials, and determine the chips and compounds best suited for your operation. We cordially invite you to visit us, and under no circumstances are you under any obligation. If you are unable to come to the Roto-Finish Plant, we shall be happy to process your parts and return them to you with all pertinent information regarding their finishing.

Roto-Finish

ORIGINATORS OF THE ROTO-FINISH PROCESSES

stop plating rejects caused by incomplete cleaning

my face was covered . . .

with heavy drawing compound and solid dirt. Alkali cleaning proved ineffective. Rejects ran high. Costs doubled.

10 seconds' soak . . .

in Emulsion Cleaner 75 followed by 15 seconds in alkali cleaner eliminates rejects due to faulty cleaning.

Enthone Emulsion Cleaner-75

1 removes stubborn oil, grease and grime almost instantly

2 insures smoother, brighter, more adherent electrodeposits

3 tapped holes, slots, embossments, corners, crevices, sculptured patterns, emerge completely clean

4 ideal for cleaning work before any phosphate treatment to avoid coarse coatings

Write for literature and operating instructions

Enthone inc

442 Elm Street New Haven Conn

USEFUL LITERATURE

For additional information on the products appearing on this and the following pages, mark the key number of the item on the card bound into this issue. Drop the card in the mail—no postage is required.

25 CLEAR AND PIGMENTED BAKING FINISHES:

A new booklet describing the line of Duranite clear and pigmented synthetic baking finishes has been issued by the Industrial Finishes Department of the Atlas Powder Company, Stamford, Conn. and North Chicago, Ill. The booklet also includes data on Duranite for controlled temperature application.

26 MACHINE SCREW USES AND DATA:

Machine screws and their uses as well as graphs showing correct tightening torques for common industrial applications is one of the articles found in Fastener, an illustrated 16-page booklet, published by Industrial Fasteners Institute.

27 DATA SHEET ON POLYVINYL COATING:

Data Sheet C-11 on Polyclad is offered by the Carboline Co. and describes the correct procedure to test coating effectiveness and lists laboratory data. Polyclad, a polyvinyl chloride coating, is a corrosion resisting protective coating for use on metal, porcelain, wood, concrete and canvas.

28 ABRASIVE BLAST GRIT IS NON-METALLIC & SILICA-FREE:

A 4-page bulletin on Black Beauty, the non-metallic, silica-free, blast grit, is now available from American Wheelabrator and Equipment Corp. The abrasive is described as one that retains its abrading qualities even when reduced to very fine material and one that wears longer than sand, but is free from silica.

29 BULLETIN ON DUST COLLECTORS:

Literature is available from Hammond Machinery Builders, Inc., Kalamazoo, Michigan, describing two new models which have been added to the company's line of dust collectors.

30 DUPLEX POLISHING MACHINE:

A new duplex centerless type polishing and buffing machine made by the Production Machine Co., Greenfield, Massachusetts, is the subject of the company's Bulletin 484. The company states that the machine was designed to give a quality finish on small cylindrical work at production speeds.

31 PROSPECT OF NEW ZINC SOURCES:

The September, 1950, issue of the Horse Head Bulletin, published by the New Jersey Zinc Co., New York, tells of progress in the development of zinc deposits owned by the company. Also described are the research activities of the company in increasing the yield of concentrate from crude zinc ore.

32 INDUSTRIAL TAPES USEFUL FOR FINISHING:

"A New Tool for Industry" is the title of a booklet brought out by the Industrial Tape Corp., New Brunswick, N. J. Consisting of 12 illustrated pages, it shows the uses of the company's line of Permacel tapes in industrial finishing operations.

33 PRECISION SWISS LAPPING MACHINES:

A four-page descriptive folder on the patented precision tool-grinding and lapping machines made by Agathon, Ltd., of Switzerland, is now available from Hauser Machine Tool Corp., Manhasset, New York.

34 AIR CYLINDER TAKES LESS SPACE:

A 12-page catalog issued by the Modernair Corp., Oakland, California, describes their entire line of air cylinders, giving engineering specifications and dimensions for "Square Circle" air cylinders. These cylinders are designed to take less space than their conventional counterparts.

35 DESCRIPTION OF ALUMINA PLANT:

A 12-page, three-color booklet is available from the Reynolds Metals Co., Louisville, Kentucky, describing operations at their Hurricane Creek, Arkansas, alumina plant. The booklet shows in a series of ten pictures how alumina is extracted from raw bauxite ore by a number of chemical treatments and processes.

36 ENGINEER'S MANUAL ON INDUSTRIAL HEAT CONTROLS:

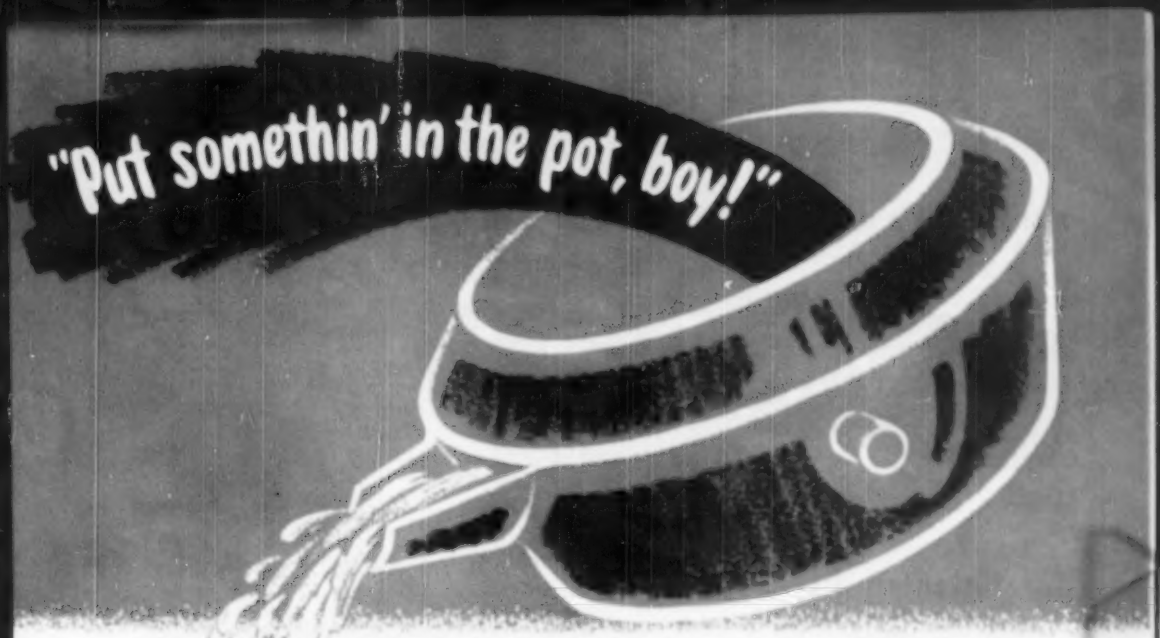
In a 24-page, two-color manual (Bulletin No. 101) issued by the Partlow Corp., New Hartford, New York, the basic principles of industrial temperature control are set down in usable fashion. Entitled "The Design and Process Engineer's Guide to Industrial Temperature Measurement and Control," the study defines the different types of control systems and distinguishes among them.

37 CATALOG DESCRIBES THERMOCOUPLES:

The Arklay S. Richards Co., Inc., Newton Highlands, Massachusetts, has issued a new catalog describing and explaining their line of thermocouples, protection tubes, thermocouple wire, lead wires and insulators for use with all makes of pyrometers.

38 LUBRICANT FOR HIGH SPEEDS, TEMPERATURES:

Technical Bulletin No. 21-E, issued by the Lubricants Division of the Lockrey Co., College Point, N. Y., describes four new types of the "oil made of metal" introduced by the company six months ago. Claimed for the molybdenum-base lubricants are longer life, greater efficiency and the ability to stand much higher speeds, temperatures and pressures without breaking down.



. . . and get NEW ANODES from YOUR NICKEL SCRAP

You can beat the nickel famine!

Dig into that nickel mine in your scrap bins. Send us those ends, swords, stubs — any nickel anode scrap. We'll cast your own metal into new oval anodes, drill and tap for hooks and ship to you pronto. You paid for this metal; why not use it? It represents a reliable source of nickel at this time and the cost of re-conversion is low. Wagner Brothers, Inc., has installed the finest melting and casting equipment available and your metal is processed under stringent metallurgical control. We're centrally located, easily reached at low transportation cost.

To handle a large volume of metal efficiently, we recommend a standard ordering and shipping procedure. Just fill out the coupon in detail and we'll send full directions for packing and shipping, and quote on any quantity.

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We have electrolytic nickel anode scrap for re-conversion.

Stubs, average length _____ inches
Weight (less hooks) _____ pounds

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Shipment can be handled in

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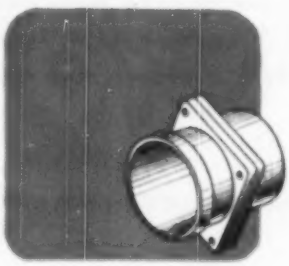
for finishing die-castings *without pretreatment*

• When die castings, particularly zinc and aluminum, are *already* clean—they need no further pretreatment. Finish them with Dykast Lacquer Enamels. You save one complete labor operation and an important amount of production time.

They *air-dry* in five to ten minutes—and provide a tough, durable coating that is flexible. These enamels are available in a wide variety of colors . . . or clear. They have excellent adhesion, suitable for many different types of products.

Dykast Lacquer Enamels are applied by either the spray or the dip method. For full details write for Technical Data Bulletin #113 and Standard Color Card. Better yet—let an M&W Sales Engineer discuss your requirements with you. It may save you both time and money.



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NEWS OF THE INDUSTRY

ECLIPSE FUEL ENGINEERING BUILDS NEW PLANT

Construction of a new factory and office building to be completed early in 1951 is announced by Eclipse Fuel Engineering Co., Rockford, Illinois. The new building will increase manufacturing area over present quarters by 200 percent.

The machine shop, boiler fabrication shop, furnace shop, assembly room and tool room will be housed in the main factory area, while the Eclipse meter accessory department and the pressed steel pot division will occupy separate quarters in an adjoining building.

Eclipse Fuel Engineering Co. manufactures gas-fired industrial heating equipment ranging from gas combustion appliances, furnaces and boilers, to gas meter accessories.

NEW DESIGN, PRODUCTION AND MANAGEMENT SERVICE OFFERED

Complete design, development, production and management analysis for manufacturers and die casters has been made available by Alfred P. Federman & Associates, 17903 Harvard Road, Cleveland, Ohio.

Services listed by the organization include six categories: die design, product development, special equipment design, shop layout, cost analysis and organization and management analysis for the die casting industry.

SURFACE COMBUSTION ENGINEER RECEIVES AWARD

An award of merit in the form of a replica of the "Lynn Pot" has been presented to Donald Beggs, development engineer of Surface Combustion Corp., Toledo, Ohio, by the Mines Experimental Station of the University of Minnesota for significant contribution in the utilization of low-grade iron ore (taconite). The form of the award is derived from the first iron casting made in America, by the Saugus Iron Works at Lynn, Massachusetts, in 1642.

A graduate of Purdue University's electrical engineering school, Mr. Beggs has been with Surface Combustion since 1936. He has held his present position with the company for the past four years.

ADMIRAL BUILDS DIE CASTING PLANT

A new, 21,000-square-foot, one-story factory for the production of aluminum die castings is being constructed for the Admiral Die Castings Co. at 310 West 83rd Street, Chicago, Illinois.

LITEMETAL DICAST pioneered in the development of a special modification of the famous Jobbins ALMAG aluminum alloys for die casting. They can now be offered to the metal using industry for many applications where malleable iron was formerly required. For example: The extension ladder lock illustrated was originally a malleable iron part. It was rough in appearance, streaked the ladders with rust, and required individual filing of parts. The new LITEMETAL ALMAG die cast locks are neat, precise and rustproof. Their excellent toughness provides a generous safety factor for the rough usage that ladders get in service.

ALMAG is tough, has high tensile strength—is not brittle. It is designed to do the job where toughness, durability and economy is required.

In addition, ALMAG is more corrosion resistant than other alloys usually used for die casting. This factor makes it highly desirable for the manufacture of lightweight marine fittings.

Die casting with these new light metal alloys offers to manufacturers greater opportunities to lower production costs and the weight of their products. Also, these metals allow more freedom of design and offer greater scope in carrying out the designers' ideas. In addition, these die castings save many man-hours of finishing time.

LITEMETAL DICAST, INC. is an organization of specialists—men thoroughly experienced in the casting and machining of magnesium and aluminum alloys—the new metals of structural design.

Write today for literature and design information.

Quick action on inquiries.

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RICHARD DIESEL PROMOTED

Richard H. Diesel has been appointed director of purchasing of the Stamford Division of the Yale & Towne Mfg. Co., it was announced recently. Mr. Diesel, a graduate of the Mechanics Institute, has had more than ten years experience in the company's lock and hardware operations.

JOHN R. TOWNSEND RECEIVES AWARD

John R. Townsend, materials engineer, Bell Telephone laboratories, has been presented with an honorary certificate for outstanding service on the Standards Council of the American Standards Association. Mr. Townsend is also a past-president of the American Society for Testing Materials.

MADE AGENT OF W. W. SLY

The W. W. Sly Co., Cleveland, Ohio, has appointed the Horrell Co., 8006 Melrose Ave., Los Angeles, California, as sales engineers for the Sly line of industrial dust control and sandblast equipment.

Our Customers Say:

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BINKS OPENS OFFICE

Binks Manufacturing Company, Chicago, Illinois, makers of spray guns and industrial finishing equipment announces the opening of a new office in Milwaukee, Wisconsin.

ILLINOIS TECH MAKES THREE STAFF CHANGES

Three staff changes in the applied mechanics department of Armour Research Foundation of Illinois Institute of Technology and the mechanics research and instruction department of Illinois Tech have been announced by Dr. Le Van Griffis, chairman of both departments.

Robert L. Janes, acting director of mechanics instruction at Illinois Tech, was named senior structural engineer.

Dr. William R. Osgood, senior research engineer at ARF, becomes director of mechanics instruction at the college.

Wilson P. Green, professor of mechanical engineering, becomes assistant chairman of the Foundation's applied mechanics department in charge of engine and lubricants research.

EUROPEANS STUDY U. S. SECONDARY ALUMINUM

Representing the aluminum industry in eight European nations, 17 men studying secondary aluminum operations in the United States recently concluded a series of meetings with representatives of the Apex Smelting Co. in Chicago and Cleveland.

This mission was sponsored by the Organization for European Economic Cooperation

with the idea of economizing on virgin aluminum consumption in Europe by a more exhaustive utilization of secondary aluminums.

The mission gathered complete data on the precise methods of control of composition and uniformity used in the domestic secondary aluminum industry.

Representing aluminum smelters, foundries, die casters and other fabricators in England, France, Belgium, The Netherlands, Western Germany, Austria, Greece and Ireland, the mission was under the guidance of S. J. Gruss of England, secretary of the Non-Ferrous Committee of the O. E. E. C. Russell Stuart of E. C. A. travelled with the mission as guide and government representative.

BRITISH PLATERS STUDY U. S. METHODS

A group of 13 specialists from the British metal finishing industry recently visited the Hanson-Van Winkle-Munning Co. of Matawan, N. J. The tour arranged by the Anglo-American

30 NEW
DIE CASTING
APPLICATIONS
Developed by
Badger Engineers:-
Each of these 30 new applications has resulted in reduced cost of materials and production, improved operating efficiency, or increased sales due to the better product design made possible by die castings.
We invite you to discuss your product with us and to investigate the advantages of Badger Die Castings.
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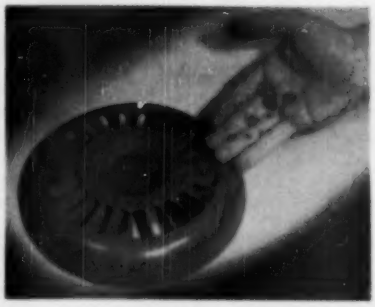
It's a Fact!

DIE CASTING IS A VERSATILE PROCESS



The Large pump head shown is a zinc alloy casting approximately 9" in diameter and weighing 4½ lbs. Smaller four tooth pinion held in hand (also zinc die cast alloy) is less than ¼" across and 2100 of them are required to make a pound. We will be pleased to work with you on your needs — just send prints or samples and specifications for estimate.

OLDEST DIE CASTERS IN UPPER MIDWEST
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Minneapolis 14, Minnesota

Council on Productivity and the E. C. A. included the study of technical and manufacturing processes in the electroplating and painting industries.

CORRECTION

In describing barrel tumbling operations for finishing magnesium die castings in the September, 1950, issue, reference was made to the Roto-Finish process developed by "the Sturgis Products Company of Sturgis, Michigan."

The correct name of the company is Roto-Finish Company, and its address is Kalamazoo, Michigan. For this double-barreled error, the editors express their apologies.

ENESS JOINS ACHESON

Acheson Colloids Corporation, Port Huron, Michigan, announces the appointment of Paul L. Eness, research engineer, to the staff of the company's Product Development Laboratory, under direction of Dr. Harold J. Dawe.

We can offer zinc die castings as small as .000004 of a lb. (250,000 to the lb.)

—SMALLNESS UNLIMITED!

GRC's method of die casting **really small** parts has opened up new fields in designs, products and economies for hundreds of manufacturers. Our exclusive, high-speed mass production facilities turn out simple or intricate parts automatically—completely trimmed, ready for use—100,000 pieces to many millions. Discover GRC's small parts possibilities for yourself—

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Automatic, well-known make, complete, like new, over 8 lbs. cap., $5,000.00

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By salesman with long established clientele on sand castings in Detroit and lower Michigan. Write Box 10150, Die Castings Magazine.

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LINDBERG EXHIBIT

This exhibit was displayed by Lindberg Engineering Company, Chicago, at the 32nd National Metal Exposition held in Chicago's Amphitheatre during October. The scaled planning model (inch to the foot) was built by Lindberg for the purpose of visually grouping its diversified manufacturing divisions which were represented.

DOW ANNOUNCES JUMP IN MAGNESIUM PRICES

It has been announced by The Dow Chemical Company that effective with shipments made on and after Saturday, September 30, 1950, price increases in magnesium products are as follows: primary magnesium ingot, 2c per pound; magnesium sticks and turnings, 3c per pound; magnesium alloy ingots, 3c per pound.

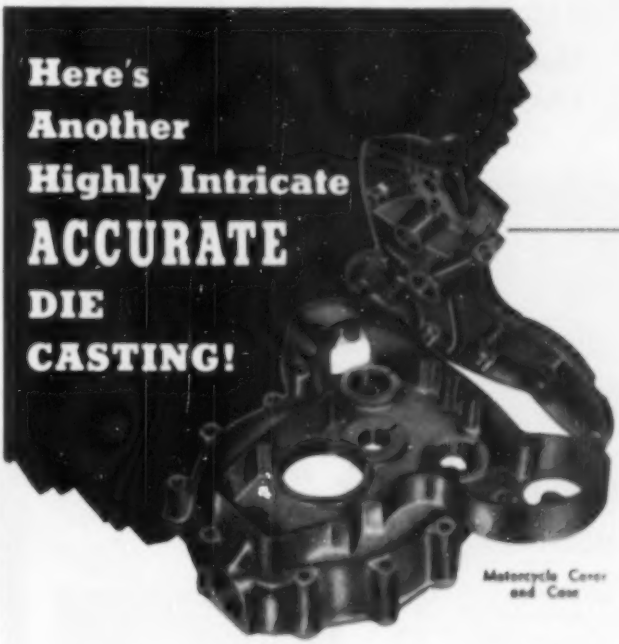
MELTING PRACTICE DISCUSSED BY R. A. COLTON

The subject of "Melting Practice and Gases in Non-Ferrous Metals" was discussed in an address by R. A. Colton, research metallurgist of Federated Metals Division, American Smelting and Refining Company, at the Regional Foundry Conference of the Texas Chapter, American Foundrymen's Society, October 5 and 6, in San Antonio, Texas.

ALMO D. SQUITERO MADE ELECTROCHEMIST BY H-VW-M

Almo D. Squitero has been appointed to the post of electrochemist in the laboratory of the Hanson-Van Winkle-Munning Co., Matawan, N. J., it was announced recently. Mr. Squitero has had a year of graduate work in electrochemistry, in addition to his Bachelor of Science degree in chemistry from Michigan State College.

Here's Another Highly Intricate ACCURATE DIE CASTING!



Motorcycle Cover and Case

THE maze of detail in this casting makes it one of the most complicated we have ever produced. Conversion to die castings on this particular job contributed to important weight reduction in the finished unit. ACCURATE DIE CASTINGS are everything the name implies.

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Specify "Certified" for High Quality . . .
Laboratory Controlled Zinc Alloy.

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COMPANY CHANGES NAME

Ralph Franklin, president of Franklin Iron & Metal Co., Newark 5, N. J., has announced that the firm name has been changed to Franklin Metals Co. The firm deals in non-ferrous scrap.

PRECIOUS METAL PLATING

(Continued from Page 47)

reasonable uniform metal content is to have an ampere-hour meter in the circuit and make additions on the basis of ampere-hour readings. Thus, the amount of gold required per ampere-hour for the conditions under which the solution is operated is determined. In order to get reproduceable results, it is necessary that the current density and temperature, as well as the free cyanide be kept reasonably constant.

This method of operation may be set-up so as to take care, not only of the metal plated out, but also of the dragout losses. It has been shown that if this method is used properly, a gold plating solution may be operated for long periods of time with no chemical an-

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1. Complete engineering and design service.
2. Wide range of quality aluminum or zinc alloys.
3. Complete mold making facilities.
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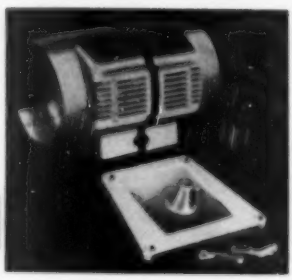

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alyses except for the control of free cyanide. The same method has been applied to gold alloy deposits where it assists in controlling color and composition of the deposit. One disadvantage that has been cited for the method is the accumulation of alkali carbonate formed from the cyanide introduced with the gold.

Maintenance of the gold content in gold plating is made easier by recovery of dragout. This is also important for economic reasons. The reclaimed solution may be used to make up evaporation losses of the plating baths or the metal value may be recovered by other ways.

Metallic impurities introduced into gold plating solutions are usually objectional as they affect the color of the deposit. For example, it has been reported[2] that copper in the bath may change the color from yellow to pink or red, according to the amount present. Silver and cadmium give a green color while nickel and zinc give a white or so-called pale color. Lead may give a lame black smut; this, has found application in producing certain antique finishes. Iron is generally thought to have little effect, if any, on the deposit.

In this connection, many platers never fail to add a considerable amount of prussiate of potash whenever they prepare a gold plating bath. As a general rule the regular methods for purifying cyanide plating solutions are applicable to gold solutions; however, since these often involve some loss of metal, exceptional care is required otherwise the loss of gold may not justify purifying the solution as compared to recovering the gold and making-up a new bath.

Thickness of Plate

Cost considerations generally limit the thickness of gold applied to most products. In many applications, the quantity applied is the least that will give a satisfactory color. For purpose of thickness testing, stripping thin gold deposits is easily accomplished if a nickel undercoat is present, as is the case with many die cast products which are given a gold finish.

It is only necessary to make the piece anode in a cyanide solution for a short time. On copper or brass it is reported[3] that the gold may be stripped anodically in a solution containing about 5 per cent of hydrochloric acid. The gold present in the stripping solution may be determined

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DIE CASTING BY FORT
ASSURED ACCURACY, QUALITY AND FAST DELIVERY
FORT has a complete engineering and designing department at your disposal with complete tool and die building facilities on the premises.
FORT has a large die casting department with new FORT built die casting machines being added regularly.
FORT has designed and built a new machine for casting automobile grilles and other items of comparable size—actual die space is 40" x 60" x 36" thick.
FORT has the enlarged facilities of its Detroit plant combined with the new Marysville, Michigan plant to greatly increase the production of FORT quality die castings to meet the most exacting delivery requirements.
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TABLE 3

Sodium gold cyanide	0.5 to 0.75 oz./gal.
Sodium cyanide	1.5 to 2.0 oz./gal.
Disodium phosphate	1.0 oz./gal.

either gravimetrically or volumetrically by one of the methods previously given for analyzing cyanide gold plating solutions. Since the quantity of gold involved may be rather small, care must be taken to make certain that the method used to determine the gold is sufficiently accurate for the purpose. One point should be kept in mind, namely, any lacquer coating present must be removed with a suitable solvent before attempting to strip the gold.

A porosity test reported[8] for gold deposited over nickel uses a reagent consisting of 3 g. of agar and 6 g. of sodium chloride dissolved in 100 cc. of water. The solution is made slightly ammoniacal and then 10 cc. of a half saturated alcoholic solution of dimethylglyoxime are added. The coated article to be tested is connected to the positive pole of a 6-volt storage battery. It is then placed in a small dish and covered with the warm reagent, which is then allowed to gel.

A layer of saturated sodium chloride solution is poured over the gel and a platinum wire cathode immersed in the solution. According to a report on the test, if a current density of 5 to 10 milliamperes/sq. cm. is used, small red spots will appear in 5 to 10 seconds at all points where the nickel undercoat is exposed.

Exposure of gold coated objects for several hours to a mixture of air and nitric acid vapor under a bell jar has been used to indicate the porosity of gold coatings on brass. In this test, discontinuity of the coating is indicated by fine "whisker-like" protrusions of blue corrosion products which develop on the side of the pores.

Production Line Pointers

The production man concerned with applying gold finishes should keep in mind that the quality of the finish may be effected by both physical and chemical factors[9]. The physical factors of the bath operation that should be kept in mind are: (1) current density; (2) agitation; (3) temperature; (4) racking; (5) base metal. The chemical factors that may have a bearing on the results obtained in gold plating are: (1) gold content of the bath; (2) Free cyanide concentration; (3) Concentration of carbonate and other salts; (4) presence of addition agents in the bath; (5) bath pH; (6) Impurities.

[1]DeLong, "Electroplating Magnesium and its Alloys"—Bulletin No. DM 108, The Dow Chemical Company, Midland, Mich.

[2]Weisburg and Graham, Modern Electroplating p. 206 (1942). Published by the Electrochemical Society.

[3]Thompson, Trans. Electrochem. Soc., 79, 431 (1941).

[4]Graham, Metal Ind. (N. Y.) 36, 279 (1938).

[5]Oldam, Metal Ind. (N. Y.) 37, 71 (1939).

[6]Blum & Hogaboom, Principles of Electroplating and Electroforming, p. 304 (1949) McGraw-Hill Book Co., New York, N. Y.

[7]Shell, Louletta, & Mulligan, "Metal Finishing Guidebook and Directory" 18th ed. (1949) p. 245.

[8]Reference 2, p. 207-208.

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There must be a reason why so many highly discriminating manufacturers entrust all of their work to us. The reason is they know from experience that the finished job will meet every specification as to appearance, strength, accuracy and function. Furthermore, the price on either long or short runs is in line with their production and selling costs.
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CURRENT REVIEWS

Book reviews, abstracts of current articles and descriptions of products and processes of special interest to the designers, purchasers and finishers of die castings are included in this department.

ASTM STUDIES EFFECT OF PRESSURE ON DIE CASTING QUALITY

Progress in the design of a test casting die for hot or cold-chamber die casting of zinc alloys has been made by the Die-Cast Metals and Alloys Committee B-6 of the American Society for Testing Materials, according to a report contained in the September, 1950, ASTM Bulletin. With the satisfactory development of a method for measuring metal pressures within the test casting die it is planned to study the effect of pressure on the quality of die castings.

An attempt is being made to devise a satisfactory compromise whereby a new code identification system, commonly known as the Frankford Arsenal System, will be used for all of the alloys under the jurisdiction of Committee B-6.

The 10-year tests of the magnesium-base and zinc-base alloys exposed at 5 outdoor and 3 indoor sites have been completed and the 10-year data are given in the 1950 report. The remaining magnesium-base and zinc-base alloy specimens will be left exposed until 1959, making a total exposure of twenty years.

THIS swooping bird provides a dramatic automobile hood ornament. Its gleaming chrome plated body is built of a pair of zinc die castings which house a small electric lamp to edylight the molded plastic wings.

The hood ornament is one of a line of auto accessories designed for Hallcraft Company of Akron, Ohio, by the industrial design firm of Smith & Scherr. The ornament is being manufactured by Electro-Line Company of Cleveland, Ohio.

The use of a die cast body provides faithful reproduction of the artist's design, smooth surfaces for easy finishing, integral mounting and assembling features, and extra durability for outdoor exposure.

METALS AND ALLOYS DICTIONARY

M. MERLUB-SOBEL

Chemical Publishing Co., Brooklyn, N. Y., 238 pages, $4.50

Designed for those who want information on the properties and applications of metals and alloys, and raw materials used in metallurgy, this book contains over 10,000 metallurgical terms, compositions, properties and uses of the important commercial alloys. It gives the physical constants and properties of chemical elements, descriptions of machinery and processes used in modern metallurgy and other information. The book is arranged in alphabetical order for easy reference.

METALS AND ALLOYS

The Chemical Publishing Co., Brooklyn, N. Y., Revised 2nd Edition, 214 pages, $5.00

A reference book for metallurgists, engineers, chemists, and the users, buyers and salesmen of metals and alloys, this book lists in tabular form the composition of some 4,600 alloys. The coverage has been limited to the non-ferrous alloys, and an effort has been made to eliminate from the first edition all alloys no longer in use while adding new ones.

The first column of the tables is an alphabetical list of the proprietary or commercial names

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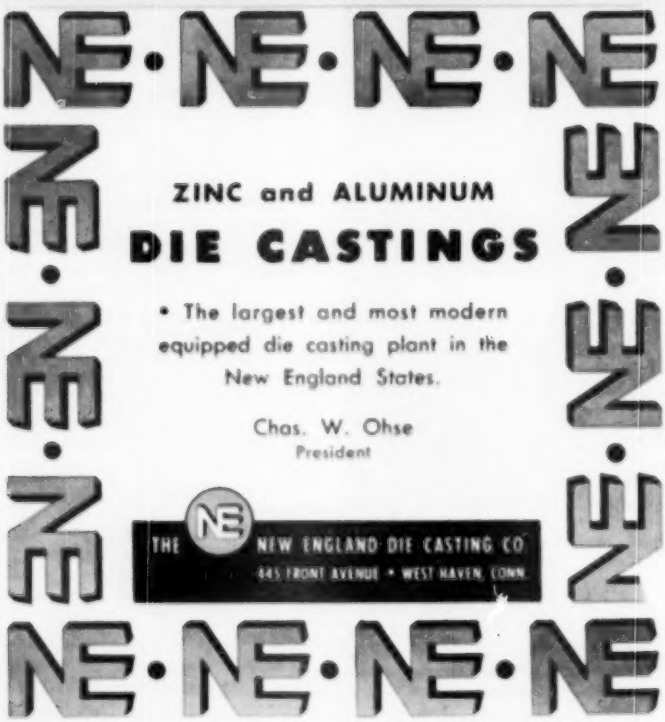
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of the alloys; or if no such names are known, the properties of, and the uses to which the metals and alloys are put, are given instead. The other columns list the percentages of the various ingredients.

SMALL PLANT MANAGEMENT

EDWARD H. KEMPEL

McGraw-Hill, New York, 499 pages, $6.00

An analysis of the many functions that aid in the establishment of efficient and profitable management, this book shows how small plants fit into the economic picture, how they are set up and operated, and the overall opportunities for small plants both here and abroad. Prepared under the auspices of the American Society of Mechanical Engineers, the book has 20 chapters.

Part I, Small Plants As Economic Factors, covers financing and banking, local and national government relations and the place small plants occupy in the industrial economy. Part II, Management Tasks, has chapters on planning, organization, operation, supervision, labor relations, sales, accounting and taxes. Part III, Small Plant Future, deals with the general outlook for small businesses in the United States and other countries.

THE SCIENCE OF WRINKLE FINISHING

W. A. WALDIE

Research Press, Inc., Dayton, Ohio, 204 pages

This book is a text on the history, formulation, and use of "Wrinkle" finishes. The author is technical director of New Wrinkle, Inc., and is the holder of many of the basic patents on Wrinkle finishing.

Part I: The Characteristics and Application of "Wrinkle" Finishes, gives the origin of the finish, explaining that a process was developed to produce a finish that previously had appeared only accidentally, to the annoyance of the finisher. Also covered in Part I are pattern, texture and gloss, color, physical characteristics, surface preparation, application and baking of "Wrinkle" finishes.

Ingredients and processing

equipment are dealt with in Part II, and nine chapters are devoted to the different formulations used to produce the finishes with varying basic oil ingredients. A chapter on pigmentation is also included.

"An Outline for the Study of Polymerization" is included as Appendix A, and is intended for those who wish to make a more detailed study of some of the changes involved in the "Wrinkle" finishing process.

DIE CASTING MACHINES

(Continued from Page 93)

surprising considering the greater number of machines in use and the inherent danger involved in operating high pressure equipment handling molten metal.

From every angle, therefore, die casting equipment in use today compares to the old styles of machines the way a 1950 Cadillac compares to the 1920 Chevrolet, but this does not mean a 1960 die casting machine will not be vastly better than today's equipment, for as more die casting machines are used, more knowledge will be gleaned and thus better die casting equipment will result.

A tabulation comparing the better known commercial machines and their trends has been prepared which will throw more light on the size, speeds, and ranges resulting from the recent plant experiences of the die casting machine manufacturers.

At this point I would like to give recognition and thanks to the various casting machine manufacturers who have given me full cooperation by furnishing the data from which I have had charts prepared to give you a more complete picture of what machines are available to us.

OPENS WESTERN PLANT

The Binks Mfg. Co. has purchased a substantial new plant located at 4915 Pacific Blvd., Los Angeles, Cal., to serve the rapidly expanding industrial west.

The plant, designed for light industrial use, was opened at the end of October. It is under the direction of J. E. Roche, manager of the West Coast Division covering seven states, and will be the focal point for the warehousing and selling of spray finishing and water cooling equipment as well as the assembly of air compressors.

PHONES USE PLATING

Electroplating of various metals plays an important part in providing us with the efficient telephone equipment of today, according to the American Electroplaters' Society. Figures supplied that body by the manufacturers of telephone equipment show that last year upward of 18,000,000 square feet of electroplating was used on such equipment.

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NEW PRODUCTS

(Continued from Page 14)

of years is now being offered to others for the protection of aluminum.

This Pylumia Process, as it is called, gives a coating with corrosion-resistance value if no paint finish is applied and, in addition, it provides an adhesive base for paint finishes.

It is an immersion process and employs a single powder whose ingredients have been proportioned and pre-mixed. As a result there is no chance for error such as might occur if separate powders had to be proportioned, weighed and mixed in a certain order. The solution is maintained by use of a simple test kit and, when necessary, by the addition of the single powder.

The costs of installation and operation are reported to be low. Ordinary heated steel tanks are all that is required. Unless there is an exceptional amount of grease and dirt on the parts to be processed, no special cleansing is required in advance for the cleaning and processing can be done in one operation.

For additional information circle No. 12 on the Reader Service card.

FASTER METHOD OF DRILLING CROSS-HOLES

A set-up of automatic drilling units for speeding up the drilling of cross-holes in parts of various sizes and shapes has been intro-

duced by the Gorro-Hotson Co., Detroit, Michigan. The illustrated set-up was designed to drill cross-holes in fishing tackle swivels of seven different sizes.

With the two drilling units operating simultaneously, up to 1,000 units per hour can be handled, depending upon the size of the swivel. Designed to clamp and unclamp the part automatically, the device is said to be readily adaptable to a variety of parts, with a re-design of the holding fixture often the only change required.

For additional information circle No. 13 on the Reader Service card.

CONVEYOR REMOVES CHIPS FROM PRODUCTION TOOLS

A new conveyor unit which continuously removes turnings or metal chips from operating automatic or multiple spindle production machines has been marketed by May-Fran Engineering, Inc., Cleveland, Ohio. Called the "Chip-Tote", this conveyor was developed to eliminate periodic shut-down of production equipment for manual scrap removal.

Chips are funneled onto the conveyor belt by means of a steel hopper, carried horizontally until clear of the machine's operating mechanism, and then up an incline for discharge into tote boxes or a carry-off system.

For additional information circle No. 14 on the Reader Service card.

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